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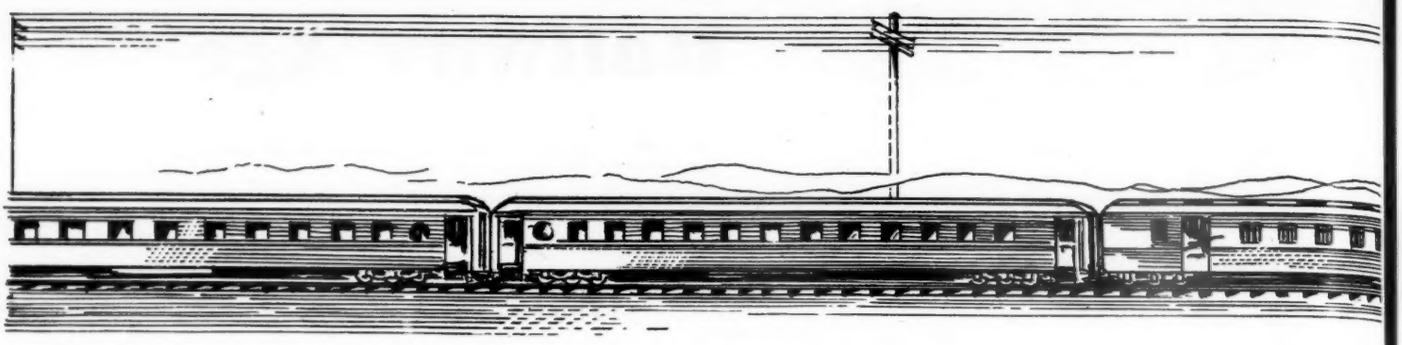

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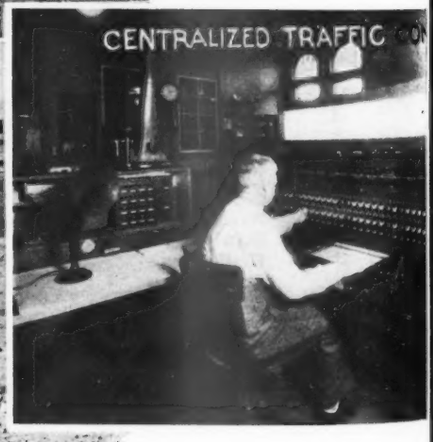

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How Secure Transport Co-ordination?

In the extended discussion which has followed the railways' proposal that competitive forms of transport be subjected to regulation, attention has to some degree been diverted from other quite important features of the railways' program. One of these is the proposal that the railways be permitted to engage in other forms of transport on the same terms as anyone else. Our inland waterways are built and maintained by the taxpayers. Is it not, then, an anomaly that the largest taxpayers in the country, the railways, are forbidden to use them?

No student of transportation believes that there is any economy in the present wasteful competition in transport. In one voice they proclaim that transport must be "co-ordinated." If this much used, and frequently abused, word means anything, it means the use of the most economical medium of transport for each given task. However, if we are to shut each form of transport off from the others, how is this co-ordination to be achieved? Under present conditions a water line may receive a shipment which ought, economically, to go by rail. Having no rail facilities, it will perforce handle the shipment by water. A railway may receive traffic which it could move more economically by highway but, having no motor transport service, it will be required to handle the traffic over the rails even at a financial loss.

Remove Panama Canal Act Restrictions

The admission of the railways to the coastwise, Great Lakes and Panama Canal trade would not work in any wise to the detriment of the shipping industry. Rather it ought to tend to stabilize and improve its service and earnings. Even so good a friend of the American merchant marine as Edward N. Hurley, former chairman of the United States Shipping Board, plainly recognized this a few years ago when he advocated the removal of the restrictions of the Panama Canal Act which prevent the railways from providing waterway transport on the same basis as any other citizens.

An eloquent exposition of what is probably the most thoroughgoing effort at transport co-ordination now being made—that of the Pennsylvania Railroad—is given in an address by General W. W. Atterbury, an abstract of which appears on another page of this issue. After mentioning that company's wide interests in highway transport and air lines and its recent venture into ocean shipping, he says "we once operated a splendid line of vessels on the Great Lakes, and should like to do so again if the Panama Canal Act restrictions were removed." He likewise urged that the railways be permitted to use the inland waterways. General Atterbury also mentioned a promising proposal for the handling of truck bodies by rail, the trucks making local collections and deliveries by highway as at present. It has been pointed out elsewhere that the line-haul cost of operating a large truck between New York and Philadelphia, is approximately 30 cents a mile, whereas the railroad could profitably provide the line-haul for the truck body at half that price. The result would be additional revenues to the railway and lower costs to truck operators and shippers.

Railway and National Prosperity

General Atterbury proceeded from a discussion of transportation to comment upon the situation of other industries and the bearing of international relationships upon our present economic crisis. This enlargement of the theme of his address is eminently fitting. No one railroad can prosper for long if the railways as a whole are in difficulties. The transportation industry cannot flourish while such an essential part of it as the railways are unprosperous. Our national economic life cannot fulfill its possibilities if efficient transportation and the investment in transport facilities is menaced. And, finally, no one nation can indefinitely con-

tinue prosperous in a world afflicted with economic malady. General Atterbury's development of his theme—from railroads into all forms of transport; thence into national economic life; and from that into international relationships—is both logical and statesmanlike. It is a method of approach which deserves wider application in the consideration of the railroad problem, as well as of our national affairs in general.

The freeing of the railroads, then, from unnatural and illogical restraints in engaging in other forms of transport is a phase of the executives' program which deserves more attention than it has thus far received. The subjection of other means of transportation to equitable regulation and taxation is necessary, and should be earnestly and constantly sought. That, however, is but one side of the solution of the present transportation muddle. The other is the co-ordination under common ownership of transport by rail, by highway, by water and by air. Attention to this aspect of the question is as necessary as is the determination of adequate regulation and taxation for the unregulated and undertaxed forms of transport.

Keep Operating Costs Low

In meeting the demands for reduced operating expenses which the lack of traffic and small revenues are now making imperative, operating officers are making the fullest possible use of their most modern motive power both in freight and passenger service. The small volume of traffic moving at the present time has resulted in the storing of large numbers of locomotives in white lead. Even a casual inspection of these pools of idle motive power, which may be seen at most engine terminals, reveals a relatively small number of modern locomotives and many locomotives which, according to modern standards, are obsolete. The low operating costs which are thus being obtained by the use of the newest and most modern locomotives available are furnishing a splendid object lesson of the possibilities of motive power which can move trains economically and which can stand up under intensive use with a minimum expenditure for maintenance per unit of service rendered.

Eventually, as business conditions improve and traffic movement increases, the available supply of modern motive power will no longer be adequate and more locomotives will have to be placed in service. The need for low-cost transportation, however, will not cease. Now is the time to plan for the replacement of the obsolete locomotives at present in white lead so that the advantage of low-cost of transportation, now being demonstrated without the masking effect of a large dilution of obsolete locomotives, may be retained when increasing traffic requires that more locomotives be placed in service.

There are probably few, if any, railroads on which there are not opportunities for a splendid return from an investment in new, modern motive power. In some cases it may be in locomotives for passenger service; in others, it may be in locomotives for heavy freight service. Still others may find their opportunity in the replacement of old locomotives by new ones in the lighter secondary services, or it may be switching locomotives which need attention. No better time than the present could be chosen for a general survey of the future motive-power needs of the entire railroad to determine just where the greatest opportunity for reducing costs lies. Such a survey as the basis for laying out a future program, covering, say, five years, will undoubtedly show the way for retaining and still further reducing the low costs of operation being demonstrated under the present stringent conditions.

Obsolescent Machinery—Whose Responsibility?

In a recent radio address, Carl A. Johnson, president of the National Machine Tool Builders' Association, expressed the belief that if American manufacturers could honestly say today, "We are buying now," they would not need to urge their customers to "Buy now," and the underlying reason for industrial depression would be largely removed. Unquestionably, the buying of modern improved machinery and equipment to replace the obsolete out-of-date machinery now being used so extensively in production work by many industries (including the railroads, which manufacture transportation), would do much to give employment to thousands of men out of work and help break the vicious circle of delayed purchases.

Records compiled by the *Railway Age* indicate that the railroads bought 14 per cent fewer machine units in 1930 than in the preceding year, and hardly any one familiar with conditions would venture to say that the number purchased in 1929 was sufficient to take care of normal depreciation and obsolescence. Mr. Johnson is authority for the statement that 48 per cent of all the metal-working machinery in the country is more than 10 years old and, generally speaking, machinery 10 years old is out of date. He presents the unusual thought that the responsibility for obsolete machinery rests with the higher officers of a company and that, instead of the works manager or shop superintendent being compelled to present an argument for new machinery, he should, at least once a year, be shown a complete inventory of plant equipment, classified by age, and required to justify the continued use of any piece of equipment over 10 years old. Such a practice would, no doubt, develop interesting consequences even in the plants of equipment and machine tool manufacturers, where some of the machines now being used could hardly be classified as modern and

improved. The railroads also are using a large amount of machine equipment which it would be hard to justify in any complete analysis of operating costs as compared to production secured.

In general, with the reduced demand for motive power, railroads are at present operating only the newest and most efficient locomotives, and the results are clearly reflected in operating economies on many roads. A dollar saved in this way, however, is no more valuable than one saved by the replacement of obsolete machine equipment in shops and engine-houses, and this is a subject in which higher railway officers may well take a personal interest. They will thereby avoid the implication in the couplet which Mr. Johnson used to close his address:

"Old machinery in the shop
Shows obsolescence at the top."

Effective Local Public Relations Work

Public relations work—presenting the railroads' case for fairer treatment by the public and the regulatory authorities—cannot be complete if it emanates only from the largest centers and deals only with the problem in general. The railroads touch almost every county in the land and in each of them there is a local public relations problem which can only be dealt with effectively from a local standpoint.

What portion of the total tax bill of your town or county do the railways pay? How many railway employees reside in your town? What is the payroll distributed among them, and what do these expenditures mean to local prosperity? Facts in answer to these questions can best be gathered and disseminated by local organizations. An interesting effort along this line is a recent broadcast in Mobile, Ala., under the auspices of the Alabama, Tennessee & Northern. The information was given in the form of a question, as follows:

DO MOBILIANS KNOW

That the railroads entering Mobile employ 2947 people who with their families make a total of more than 12,000 people, or about one-fifth of Mobile's population, dependent on the railroads for their support?

That the railroads pay these employees in wages $4,732,328 annually?

That this money is expended with Mobile merchants and others in business here?

That this is the largest payroll of any single industry in our community?

That this payroll being spent in Mobile naturally will be increased or decreased in proportion to the amount of traffic given the railroads by Mobile people and it seems fair for the business people of Mobile to have these facts in mind when solicited by trucks, bus or barge line competitors of the railroads.

Somewhat similar efforts have been made in a number of localities, but is it not an idea worthy of nation-wide emulation? If it is assumed that Mobilians do not know the facts outlined in the above, may it not likewise be assumed that inhabitants of other cities, and smaller places too, also are not familiar with the importance to them of their local railways? There is many a community in the country which, without being aware of the fact, would face ruin if it were not for the contributions of the railways—in taxes and wage payments.

Facts such as the above are easily obtainable locally and do not involve the complexities of a discussion of the railroad problem on a national scale. Almost every railway employee, armed with such facts, could become an effective committee of one—able to present an unanswerable argument for more adequate regulation and taxation of the railways' competitors and fairer treatment of the railways.

Substituting Motor Coaches for Trains

In general there are two types of motor coach operations carried on by railways: That in which motor coaches are used to supplement or extend train service, and that in which motor coaches are used in substitution for train service. The Illinois Central affords a clean-cut example of the latter type of operation. An article in the Motor Transport Section of this issue describes the results of motor coach substitutions for trains as carried out by this road.

Briefly, the results of motor coach operation by the Illinois Central on two lines in Iowa have been substantially reduced operating expenses, the maintenance of adequate transportation service, and the attraction of sufficient traffic to the motor coaches to more than pay their operating expenses. In most cases of motor coach substitutions for trains, the motor coach operation itself is carried on at a loss, and the benefit of the substitution lies entirely in the reduction of railway operating expenses. The Illinois Central is fortunate in having been able not only to reduce its expenses, but also to earn a respectable profit from the motor coach operation on its own account.

Diminishing traffic, due to a variety of causes, has made the operation of many local passenger trains a source of substantial loss to the railways. It is not always possible, furthermore, to remove trains, no matter how wide the gap may be between operating costs and revenues. As a result it is frequently necessary to resort to some substitute means of transportation which will render adequate service economically. Many roads, like the Illinois Central, have found the answer to lie in the operation of rail motor cars or motor coaches. The choice between them is usually based upon the amount of traffic to be handled, but both are effective means of reducing operating costs while maintaining service.

Cars For The Reading Suburban Electrification

Rapid acceleration and high schedule speeds made possible by use of aluminum alloys and new and improved motors

By G. I. Wright

Engineer, Electric Traction, Reading Company

THE Reading Company will soon place in service 70 new multiple unit electric cars for use on its Philadelphia, Pa., suburban electrification. These cars are 72 ft. 11½ in. long, seat 86 people, weigh 126,500 lb. without passengers and will operate on an 11,000-volt, single-phase, 25-cycle, inclined, overhead catenary system.

Each car is equipped with two 300-hp. motors which are the largest single phase, alternating current motors ever built for this type of service. Aluminum parts have been used wherever possible and the resulting saving in weight, along with the large capacity of the motors, results in high schedule speeds and an accelerating rate of 1.25 miles per hour per second. This is higher than has heretofore been attained on an alternating current car of this size.

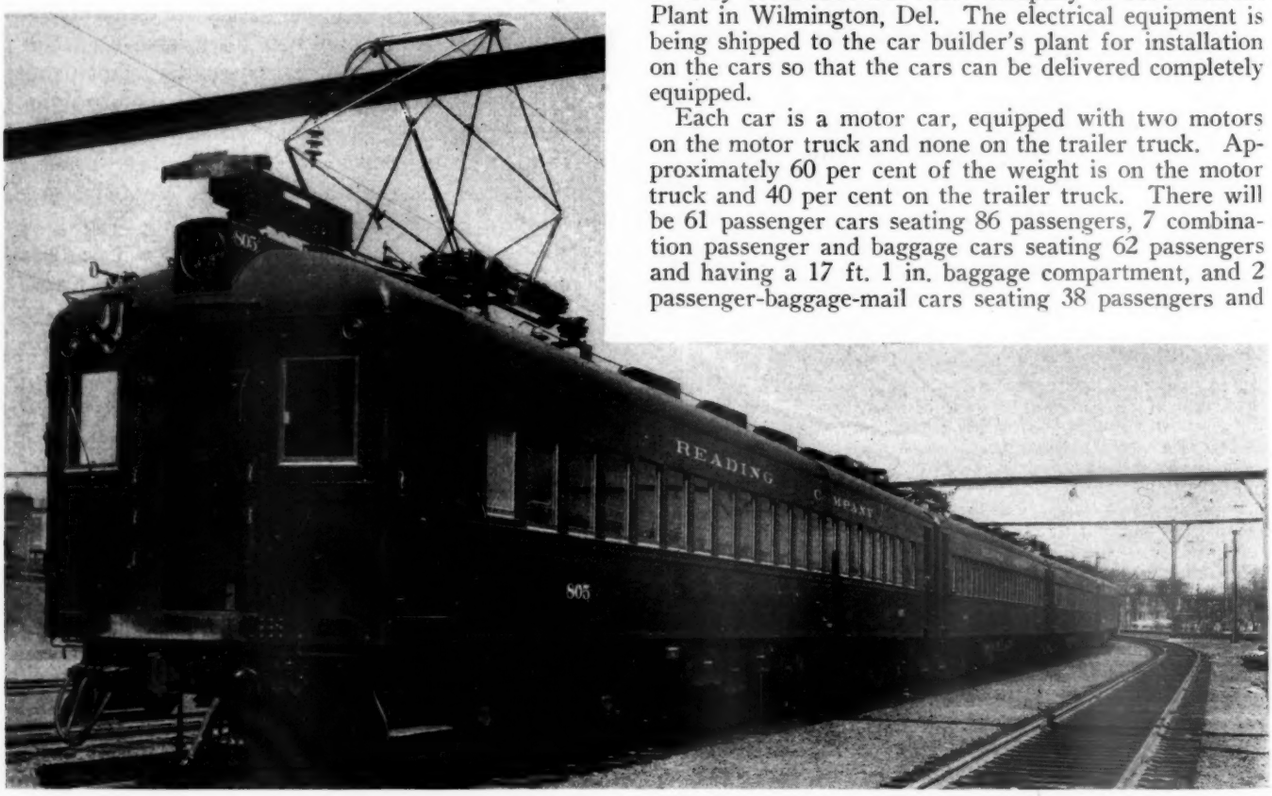
A number of new developments are incorporated in these cars, all designed by the Reading Company. These are: A power bus line connector to save pantograph and trolley wear; a new design of ventilating system for the electric equipment to save cleaning and maintenance; a spring motor nose suspension to facilitate changing of motors; a magnetic door latch and thermostat control to save heat; and a flexible air connection to the motors which is self-aligning and self-connecting.

Each car is a complete unit, having its own battery and air compressor, with a control cab at each end. Electro-pneumatic brakes are used and all cars are equipped with cab signals. Particular attention was given to the appearance and interior finish of the cars.

General

The 70 cars are being built for the Lansdale, Pa., Doylestown, Pa., Hatboro, Pa., and West Trenton, N. J., services. It is estimated that 30 more will be required for the Chestnut Hill, Pa., and an additional 30 for the Norristown, Pa., service, making a total of 130 for the complete suburban electrification. These cars are being built by the Bethlehem Steel Company at their Harlan Plant in Wilmington, Del. The electrical equipment is being shipped to the car builder's plant for installation on the cars so that the cars can be delivered completely equipped.

Each car is a motor car, equipped with two motors on the motor truck and none on the trailer truck. Approximately 60 per cent of the weight is on the motor truck and 40 per cent on the trailer truck. There will be 61 passenger cars seating 86 passengers, 7 combination passenger and baggage cars seating 62 passengers and having a 17 ft. 1 in. baggage compartment, and 2 passenger-baggage-mail cars seating 38 passengers and



A Reading Multiple Unit Electric Train—One of the 11,000-Volt Bus Connectors May Be Seen Above the Headlight on the First Car

having a 16 ft. 8½ in. baggage compartment and a 17 ft. 1 in. R. P. O. space.

Use of Aluminum

A careful study of the use of aluminum alloys and the economies involved due to resultant weight savings, was made. Alternate bids were obtained from the car builder on use of aluminum in various parts which resulted in its use for the following:

Floor sheets	Heater guards
Roof sheets	Platform floor plates
Vestibule end sheets	Door panels
Body end sheets	Conduit and fittings
Side and end linings	Headlights
Saloon sheets	Motor generator frame
Steps and treads	Switch group box
Trap doors	Relay box
Parcel racks	Bus connector parts

This resulted in a saving of 6,640 lb. per car at an added cost of $1,475. The estimated annual saving in power cost due to this weight reduction is $232 whereas the interest on the additional investment is $74, making a net annual saving of $158 per car or $11,060 for the 70 cars.

The trucks, side sheets, underframing and all stress carrying members are of steel construction. The center sill consists of two 9-in. channels with a ¼-in. top cover plate and a $\frac{7}{16}$-in. bottom cover plate extending between buffer sills. This center sill forms a duct to carry ventilating air from the blower to the motors. The roof is of the single-deck type covered with aluminum roof sheets and reinforced to carry a pantograph at one end and a bus connector at each end. Steel hood sheets are used due to the difficulty in shaping aluminum. Salamander hair insulation is used throughout.

Interior

The seating arrangement consists of 37 cross seats spaced 33½ in. from center to center to provide ample leg room, and three longitudinal seats, each seating four people. Grab handles are provided on the corners of the seat backs next to the aisle, so as to give the passengers a means of support and to prevent wear on the corners of the seat backs from handling. The seats are of the plush covered reversible type with arm rests and fixed foot rests. Baggage racks are provided and arranged so that the space above them can be used for advertising. One toilet is provided in each car.

The interior of the car is painted three-tone gray, striped in blue and gold. The hardware fixtures, baggage racks and light fixtures are of a sanded nickel finish, giving the cars a clean, bright appearance. Brass window sash is used which eliminates sticking and adds to the appearance of the car. The flooring consists of blue-gray Flexolith 3/8 in. thick laid on Truss Plate.

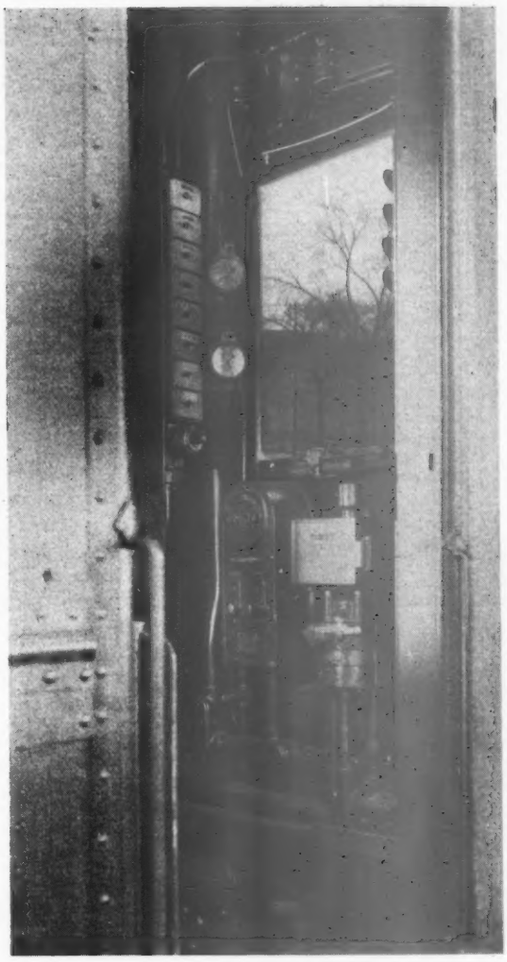
Signals

There are no signal or emergency cords passing through the car, the signals being electrically operated by push buttons. The emergency cord is located in the vestibules, but is accessible from the inside of the car.

Push buttons for the conductor's signal buzzer are located, two in the interior of the car, one over each vestibule end door, and one under each corner post of the car. The latter are provided so that the conductor can stand on the station platform and signal the motorman to start, just before he boards the train, thus saving a little time at each stop. The warning signal consists of a Westinghouse double pneuphonic horn located on the vestibule hood at each end of the car.

Lighting

The lighting consists of eight dome fixtures with opal glass bowls using 100-watt lamps. These lights are arranged on two circuits and will be controlled from a switch panel in the vestibule of the cars. This panel has an opening which enables the trainmen to have access to the switches without opening any doors. A door is provided, however, which gives access to the fuses and connections in case of trouble. An Electric Service Supplies Company "Goldenglow" fixed focus headlight using a 250-watt lamp is built into the hood on each end of the car in a manner that gives a streamline appearance. Each headlight is controlled by a 4-position switch in the motorman's cab which gives him "off," "high," "medium," and "low" control of the headlight. Electric marker lamps are built into each corner of the car. The different colors are obtained by swinging lenses, operated from handles which project down through the marker light box to within easy reach of the operator. These handles are painted red, green and yellow, to indicate the color of the lenses they control.



Motorman's Controls as seen Through the Vestibule Door

Trucks

Fifty cars are being equipped with Taylor flexible trucks and 20 with Commonwealth trucks, both of which are equipped with manganese steel pedestal and bolster liners to minimize wear. Thirty-eight-inch wheels on a 6-in. by 11-in. axle are used in the motor truck with a wheel base of 8 ft. 9 in. and 36-in. wheels on a 5½-in. by 10-in. axle in the trailer truck with a wheel base of 8 ft. Plain friction side bearings with 16½-in. by 4-in. by 3/8-in. hardened spring steel wear plates are used.

Car Interiors are Finished in Three Tones of Gray Striped With Blue and Gold

These trucks are so designed as to be interchangeable. A spring motor nose support is provided which makes it possible to remove the motors from the truck without first removing the truck from the car. It is also possible to drop wheels with the truck and motors in place, thus eliminating the necessity of disconnecting the motor leads when changing a pair of wheels. All trucks are equipped with friction journal bearings.

Air Brakes

The Westinghouse Air Brake Company type AMUE-1812 electro-pneumatic brake equipment is used and set for a braking rate of 1.5 m.p.h.p.s. Compressed air is supplied by an air compressor having a displacement of 35 cu. ft. per minute and driven by a 7.5 hp. single-phase motor, operating on 105 volts. This compressor is mounted on rubber pads to minimize noise and vibration.

The Commonwealth trucks are equipped with simplex clasp brakes and the Taylor trucks with clasp brakes of the Taylor type.

It was decided not to use brake shoes that brake on the flange of wheel due to the danger of cracking the wheels with the intense heat caused by making frequent stops from high speeds at a high rate of retardation. Considerable effort was devoted to the design of the brake system to prevent chattering and rough stops.

Motors

Each car will be equipped with two 300-hp. motors of the single-phase compensated series commutating pole type, connected in series and operating on low voltage from taps on the car transformer. Forty cars will be equipped with General Electric GEA-620 motors, 28 with Westinghouse 423-B motors and 2 with American Brown Boveri-E.D.T.M. 544 motors. The three motor manufacturers have matched their motor characteristic curves so that any combination of equipment will result in smoth train operation. All motors are equipped with roller armature bearings.

The motor was selected on the basis of the most severe service, namely, the Chestnut Hill local service, due to the fact that the runs are short and the grades and curves are severe. The average length of run from Wayne Junction to Chestnut Hill in local service is 0.57 miles, with a compensated grade and curve resistance of 18.2 lb. per ton. The maximum safe speed with new wheels is 72 m.p.h.

The motors represent radical improvements over previous designs and have high efficiency and power factor, with low weight per horsepower and excellent commutation. It is hoped that maintenance costs will reflect these improvements.

Control

The main controller is of the automatic accelerating type located under the car and remotely controlled through a 32-volt circuit from a master controller in the cab. A current limit relay is used to give an accelerating rate of 1.25 m.p.h.p.s. up to about 27 m.p.h. The master controller has three notches, namely, "low speed switching," "slow running" and "full running."

This master controller has the "dead man's" release. It also has a foot pedal to hold it in any position so that the motorman can have both hands free if desired. Sixty-six cars are equipped with Westinghouse control, 2 with General Electric and 2 with American Brown Boveri.

The 12-point train line jumpers are provided at each end of the car and arranged so that cars can be coupled from either side of the train. Dummy receptacles hold the free end of the jumpers when not in use. The high voltage circuit is protected by a pantograph lowering relay. The motor circuits are protected against faults and wheel slipping by a differential protective relay.

Interchangeability of Equipment—Heating

In order to reduce the number of hangers and to simplify the installation and maintenance of the car equipment, considerable effort was expended in getting the three manufacturers to design their equipment so that it could be mounted on common hangers, and so that different parts would be readily interchangeable. This made it possible for the car builder to work from one set of drawings. For electrical reasons it will be impossible to interchange motors, transformers and reactor coils, but the design is such that trucks, wheels, bearings, gears, blower-generators, etc., can be interchanged.

The car heating system consists of 40 heaters located under the seats and having two 325-watt open coil elements each. These heaters are arranged on two circuits

with one coil of each heater on each circuit. Ten coils are connected in series, operating on 360 volts. Double thermostat control is provided so that when the motorman has his plug in the master controller, the thermostat setting will be for 65 degrees F., and when he does not have his plug in the master controller the thermostat setting will drop to 50 degrees. The purpose of this is to conserve energy, and to provide a means of bringing the cars up to a medium temperature in the yards before going into service. The motorman is required to be in his cab several minutes before time for train departure, and when he gets on the train and plugs in his master controller plug, the thermostat setting will change from the 50 degrees to the 65 degrees setting, which will give the train time to warm up before departing.

The motorman is provided with a "train heat" switch which enables him to change from the 65 degrees to the 50 degrees setting at will. Operating rules will require him to cut off this train heat switch a short time before reaching his terminal, unless the equipment is going to remain in service. This should result in a considerable saving in power cost.

A magnetic door latch is to be used on the body end doors. This will hold the door open during the time in which a train is standing in a station, but releases the door immediately as the train starts. An air cushion door check then causes the door to swing shut. This, it is believed, will result in considerable power saving in the form of heat, due to the fact that the cars are not equipped with diaphragms and that with short runs it is impossible for the trainman to keep the side and trap doors closed.

Each cab is equipped with a 1,000-watt heater operating on 105 volts. Supply is taken off the same transformer tap as for the air compressor. The cab heater is arranged horizontally near the floor, just under the footrest, making it possible for the motorman to keep his feet warm. When the cab is not in use, the vestibule is entirely free from obstruction.

Cab Arrangement

Each end of the car is equipped with a motorman's cab with complete control equipment. All cars are equipped with cab signals but do not have the automatic stop and speed control features. The motorman will have his color indicator in the right hand corner of the cab about on a level with his face.

Shatter-proof glass is used in the motorman's window and a "Hayes Air Push" window wiper is provided to keep it clear of water and snow. On the left side of the cab is a gang of eight toggle switches which control cab heat, train heat, vestibule lights, etc. A drop sash in the side door supplies ventilation and allows the motorman to look out and to the rear.

Ventilating System

About 4,000 cubic feet of air per minute are required to ventilate the motors, transformer and reactor coils. Very special attention has been given to the design of a ventilating system which will give this much or more air under all conditions. A carefully designed intake and filter are used to keep down the velocity of the air and to keep out moisture and dirt. The air is carried from the blower to the motors through the center sill of the car, thus avoiding the use of a large amount of piping.

A secondary intake is provided between the filter and the blower wheel which will automatically open should the filter system become plugged with snow, ice or dirt. This emergency intake will automatically close when the filter is cleaned. A flexible air connection carries the air from the center sill to the motors. This connection is designed so that it automatically disconnects itself when a motor is removed. When the motor is replaced the connection automatically goes back into place without any effort on the part of a workman.

A "No blower cut-out" is connected in such a manner that it interrupts the control circuit and cuts out the motors on the car in case of a blower failure. This means that a particular car is inoperative unless its blower system is functioning. For shop testing a switch is provided which by-passes the no blower cut-out when the control box cover is removed.

The blower is driven by the blower-generator set. This set consists of a 15-hp. motor operating on 360 volts and mounted on rubber bushings to minimize noise and vibration. This motor is started as a 3-phase motor by cutting in a resistance. When it comes up to speed a contactor opens and the machine runs as a single phase motor.

One of the Taylor Trucks with the Motors Installed

An 1,800-watt generator forms a part of the blower-generator set and is used to supply energy for the 32-volt control and lighting system. A 15-cell lead battery of 70-ampere hour capacity floats on this generator and a generator regulator is used to keep the generated voltage within the narrow range of variation required by the cab signals.

Pantograph, Bus Connector and Wiring

One single shoe pantograph is used per car, mounted directly over the motor truck. Steel contact strips will be used initially but it is planned to experiment with other materials later on a few cars at a time. No grease is to be used on the pantograph due to the fact that there will be steam operation under the overhead system.

An 11,000 volt, power bus-connector is mounted on each end of the car and operated by compressed air so that it is possible to operate trains up to 10 cars in length with only two pantographs up, thus saving wear on the overhead system and pantographs. The use of this connector should also minimize the number of pantographs wrecked by getting caught in the overhead. It is planned always to operate with two pantographs up in trains of two or more cars, in order to reduce the arcing at the shoe by furnishing two parallel paths for the current. Each car will draw an average of about 60 amperes at 11,000 volts during the straight line acceleration.

A great deal of study was given by the railroad engineers to the arrangement of the wiring and conduit. Models of the wiring were made up and studied to eliminate crosses and to keep the wiring as short and as simple as possible.

Comfort to the passengers, speed and ease of operation, elimination of weight, reduction of maintenance costs, accessibility and reliability of apparatus, are the things which were kept in mind in the design of this car equipment.

The design of these cars represents the coordinated efforts of the mechanical and electric traction departments of the Reading Company, with R. A. Hardy, head car draftsman, office of superintendent of motive power and rolling equipment in charge of the mechanical design, and W. H. Smith, assistant engineer, office of engineer electric traction, in charge of the electrical design.

Waterways Corporation Reports "Profit" for 1930

WASHINGTON, D. C.

DROUGHT and depression seem to have had a beneficial effect on the operating results of the Inland Waterways Corporation for the calendar year 1930. With a decreased volume of traffic, a total of 1,424,477 tons in 1930 as compared with 1,575,229 in 1929 and 1,758,244 in 1928, the corporation was able to reduce its operating expenses so much more than its revenues were reduced that it ended the year with a net operating income of $65,177, as compared with a net operating loss of $72,798 in 1929, and a "net profit" of $46,336 for the year, as opposed to a net loss of $354,048 for 1929, according to the annual report just made public by Major General Thomas Q. Ashburn, chairman and executive of the corporation. At least the income comparisons are from his annual report for 1930. For the tonnage comparisons it is necessary to refer to previous reports.

Operating revenues for the year amounted to $6,129,213, as compared with $6,529,177 in 1929, a decrease of $399,964, or 6.1 per cent. Operating expenses amounted to $5,966,991, as compared with $6,587,081 in 1929, a decrease of $620,090, or 9.4 per cent. The decrease in tonnage was 9.6 per cent. Maintenance expenses, for equipment and terminals, were reduced $220,687, transportation expenses were reduced $366,502, and general expenses were reduced $122,243, while traffic expenses were increased $89,801. The operating income for the year was $162,221, as compared with an operating loss of $57,904 in 1929. The net profit for the year transferred to profit and loss, $46,336, reduced the debit balance at the end of the year to $489,748 and the total investment of the corporation, as shown by its report, was increased from $20,887,510 to $23,957,901. Of this $12,000,000 is represented by capital stock issued and the company has $3,000,000 of stock unissued. The reserve for accrued depreciation amounted to $2,444,410 at the end of the year.

The showing of a net profit for the year was made, General Ashburn said in his report, "despite an unprecedented period of depression," and "a long-continued drought of such proportions as to become a national calamity." The upper Mississippi, he said, was far less navigable during the year than during 1929, and on the lower Mississippi there was experienced "the longest period of extreme low water on record." but maintenance of way is not one of the expenses which this corporation has to contend with, as that is charged to river and harbor appropriations, and the smaller tonnage enabled it to reduce its transportation expenses almost proportionately.

The Lower Mississippi division in 1930 handled 1,149,864 tons of freight as compared with 1,292,876 in 1929. The upper Mississippi division handled 105,494 tons, as compared with 105,950 in 1929, and the Warrior division handled 235,266 tons as compared with 254,555 in 1929. The total of the division tonnages is 1,490,624, but 66,147 tons were deducted in the report, as representing inter-division tonnage. The net tonnage shows a reduction of 150,572 tons as compared with 1929 and most of this is accounted for by the loss of the 136,928 tons of bauxite ore handled in 1929. It is understood this traffic is now moving by rail.

The operating expenses as stated in the report include $523,835 for depreciation and $18,364 for other "charges against profits which required no expenditure of funds," so that the "funds expended for expenses" amounted to $5,753,763, and the funds obtained from operation amounted to $607,377. Operating expenses also included $3.31 for water line tax accruals. The funds obtained from operation, together with $3,000,000 obtained from the issuance of stock and some other items, have been applied or allocated to working funds for operating subsidiaries and to the purchase of property and equipment.

A large part of the report is made up of repetitions of parts of speeches made by General Ashburn during the past year. "If opponents of waterways feel," he said, "that the operation of our federal barge lines is a menace to rail prosperity, we call upon them to advise the railway executives to comply willingly and sympathetically with the law, and help us to attain quickly what we desire, the retirement of the government from the transportation business."

THE GREAT WESTERN of Great Britain has moved its New York City passenger and freight offices from 505 Fifth avenue to 500 Fifth avenue, room 414.

Pruning and Weeding Stocks Aid A. C. L. Supply Work

Co-operative activities in standardization and simplification eliminate 8,000 varieties of material with important results

Simplification has Reduced Stocks at Local Stores

By L. F. Duvall,
Assistant General Storekeeper,
Atlantic Coast Line,
Wilmington, N. C.

BY consistent study and efforts in the field of standardization, and especially in the field of simplification, of materials and supplies, the Atlantic Coast Line has reduced the number of kinds and sizes of materials commonly carried in stock from 30,765 items, studied, to 22,764, a net reduction of 8,001 items, or 26 per cent, taking into consideration 1,534 new items added to the list during the period. This work, which was carried on with the co-operation of the engineering, mechanical and other using material-departments, is a bright spot in the Atlantic Coast Line's supply work and has been valuable to the road in several ways.

Nature of the Work

There is a distinction between standardization and simplification. Standardization requires special knowledge of the performance of machines of the parts in question. It involves a knowledge of the initial cost of production, the cost of operation, renewals, etc. The Atlantic Coast Line has for years given close consideration to this type of work, including the preparation of standard formulae for the composition of steel, paints, etc., but little thought had been given to simplification.

Simplification is the search for the way to do things in the least expensive and complicated manner consistent with good practice. If a piece of steel, 1 in. by 8 in. by 12 in. is needed, simplification may require its production either from a 1-in.. by 8-in. plate or from a 1-in. by 12-in. plate, or, if the use or the item is limited, it may be preferable to make it from scrap material, as required, and not carry it in stock. Simplification may also require that a machine bolt, ½ in. by 4½ in., should be used in place of a ½ in. by 4-8/16 in. bolt.

The possibilities of simplification were impressed upon the Atlantic Coast Line stores with the inauguration of a special study begun in 1926 for new and better methods of controlling the investment in materials and supplies. It was discovered that the practice of using supplies was not uniform. Each shop had its own preferences for material and the practices varied considerably. It was difficult, in some cases, to meet shortages at one shop by transferring material from another shop. Frequently, the use of slightly different material for the same purpose at different points would result in a surplus of an item at one place, while a shortage of an item required for a similar purpose existed elsewhere. Conditions such as those not only caused needless delays to work, but unnecessary clerical work to obtain and control the material. Reducing the number of items used for a similar purpose would also automatically allow the quantities of standard materials to be increased and this would assist the road in purchasing at lower prices without increasing the total investment in materials and supplies.

Simple Methods Used

Simple methods were used in carrying out the program. All items of stock were studied, class by class, and the items adopted were based on consumption. When we found that an item was used at only one point, an investigation was made to determine the necessity for its use and it was often found that other material commonly carried in stock would answer the purpose. Where an item was used only in small quantities, a special study was made to see if other material could not be used. The officers in charge of the using departments realized the possibilities in the work and each foreman and subforeman participated in the study of the material used. Drawings were changed wherever necessary to avoid confusion between the standard lists and blue prints.

Itemized Results

The results of the simplification program up to the present are shown in the accompanying table. Examples

Atlantic Coast Line Stores Practice

of the work are found in the reduction of the kinds and sizes of frogs, switches and crossings carried in stock from 110 items to 62; the elimination of 1,398 items from the stock of bolts, nuts, washers, etc.; the elimination of 454 varieties of locomotive forgings; and the cancellation of 586 items of car forgings. The varieties of air brake material carried in stock were reduced from 1,639 to 1,231; 477 items of iron and steel pipe stock and fittings were cancelled, and over a thousand items of hardware were eliminated as unnecessary.

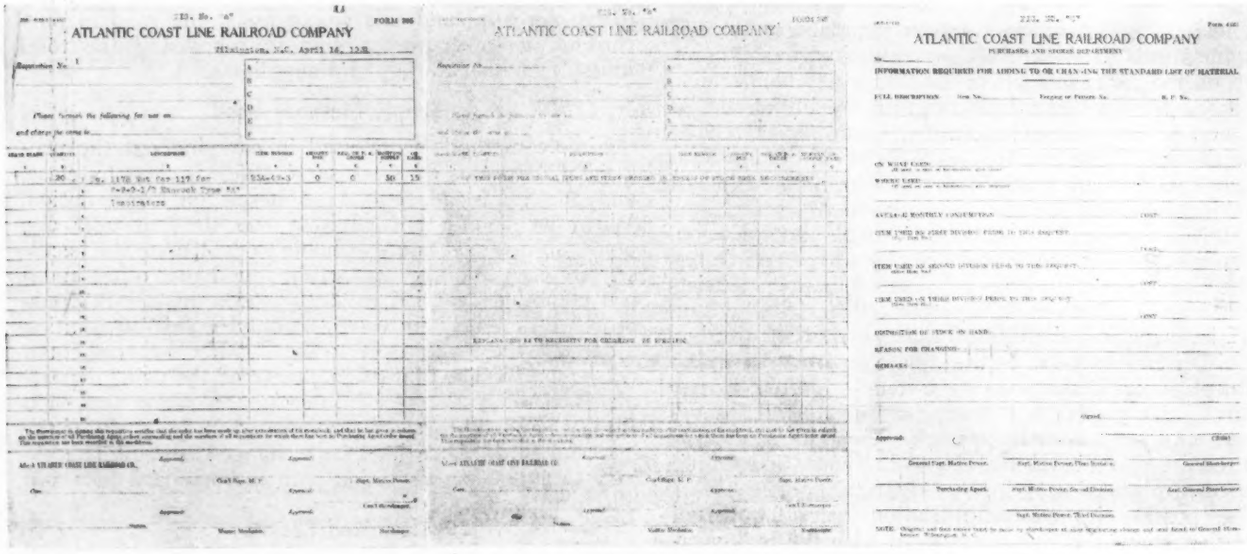
The practice followed at present in ordering material in accordance with the program of simplification is as follows. Addressograph plates are prepared for all standard items and requisitions for material are made direct from the stock books so that the descriptions will be identical with the addressograph record. The requisitions (Fig. A) are checked against the standard list in the purchasing agent's office and a red X is placed opposite any discrepancies. We sometimes discover mistakes that would result in ordering the wrong material or in surplus and delays if not detected.

Material Not Standard

In order to bring to the attention of all concerned, items which have been ordered that are not on the standard list, a special yellow requisition (Fig. B) has been prepared. Careful consideration is given by officers signing these requisitions and they are often cancelled before they reach the purchasing agent and general storekeeper. Special study is also made of these requisitions in the office of the general storekeeper. In some cases, we find that an item already listed will answer. Prices are secured on important items and if there is any doubt as to the need of ordering the material in

Results of Simplification of Stores Stock

Class	Number items studied	Items added	Net reduction	Number active items
Frogs, switches, crossings and parts	110	...	48	62
Track fastenings, bolts, spikes, etc...	54	...	4	50
Track tools	250	...	3	247
Motor car parts	1,834	...	...	1,834
Telegraph and telephone material	716	14	201	515
Bolts, nuts, washers, etc.	2,386	82	1,398	988
Locomotive and car springs	250	21	11	239
Boiler tubes	237	...	93	144
Arch brick	40	2	3	37
Brass, copper and steel tubing, etc...	167	7	76	91
Bar iron and steel, and light sheets..	610	64	254	356
Boiler plate	159	14	87	72
Locomotive forgings	1,305	9	454	851
Car forgings and shapes, brake beams etc.	2,083	98	586	1,497
Locomotive castings	2,428	206	189	2,239
Car castings	1,986	43	161	1,825
Brass castings and journal bearings..	790	41	179	611
Air brake material	1,639	108	408	1,231
Locomotive appliances	2,293	243	504	1,789
Locomotive stokers, feedwater heaters, etc.	662	121	71	591
Passenger car trimmings and material	1,565	44	490	1,075
Electrical fittings for locomotives..	733	17	133	600
Electrical material for track lines..	1,586	92	208	1,378
Power plant equipment	304	...	304	...
Other electrical material	519	65	173	346
Shop fuel	5	...	...	5
Foundry supplies	124	...	3	121
Wheels, tires, and axles	125	10	6	119
Locomotive and car lumber	147	...	...	147
Boilers, fireboxes and tenders	26	...	24	2
Floating equipment	48	...	41	7
Train and station supplies	734	5	98	636
Oilhouse material	47	...	8	39
Iron and steel pipe and fittings	1,527	30	477	1,050
Hardware	1,277	62	376	901
Hand and small machine tools	1,272	33	748	524
Rubber and leather goods	292	38	154	138
Painters' supplies	424	65	28	396
Stationery and printing	11	...	...	11
Total	30,765	1,534	8,001	22,764


ATLANTIC COAST LINE RAILROAD COMPANY
ATLANTIC COAST LINE RAILROAD COMPANY
ATLANTIC COAST LINE RAILROAD COMPANY
PURCHASING AND STORES DEPARTMENT
INFORMATION REQUIRED FOR ADDING TO OR CHANGING THE STANDARD LIST OF MATERIAL

Figs. A, B and C Showing Forms Used in Simplification Work Which Are Printed Letter Size, Form B Being Orange Color for Use in Ordering Special Material

question, the question is handled direct with the heads of the using departments. Explanations are always given in full as to the necessity for ordering.

It is recognized that no standard is final and a standard item becomes obsolete when another item is found that is better and more economical for the purpose. In order to have an effective standard list, it thus becomes necessary to make changes from time to time. A special form (Fig. C) is provided for this purpose. This form must be filled out in detail and signed by the person wishing the change, or addition, and sent to the general storekeeper. A copy of the form is sent to the superintendent of motive power or engineers of maintenance of way for each division for their report in the space provided.

The disposition of stock on hand is also important to consider when making changes and a space is provided for explanations of this on the form. When this form is properly filled out, it is presented to the heads of the using departments for final approval.

It is difficult to estimate the direct savings from the standardization and simplification work. We do know it is a great factor in stock control. It creates a better understanding between the using and stores departments as to the use of material, promotes uniform practices in the using departments and creates an interest as to the proper and most economical use of material. The success of such a program, however, largely depends upon the full and hearty co-operation of each department concerned. This co-operation has been obtained in the Atlantic Coast Line's work.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended April 11 amounted to 737,934 cars, an increase of over 9,000 as compared with the week before but still less than the totals for the last two weeks in March. As compared with the corresponding week of last year this was a decrease of 173,382 cars, and as compared with 1929 it was a decrease of 235,218 cars. All districts showed reductions as compared with both years, as did all classes of commodities except grain and grain products, which showed an increase as compared with 1929. The Summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week ended Saturday, April 11, 1931

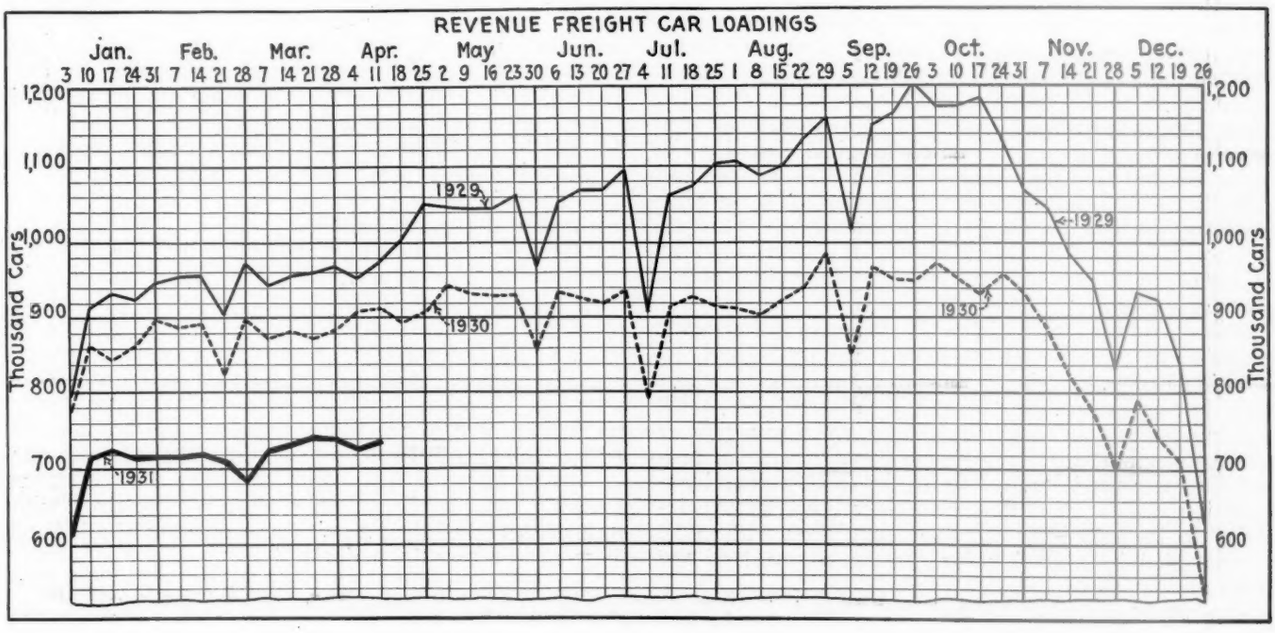
Districts	1931	1930	1929
Eastern	174,274	206,004	230,696
Allegheny	148,792	187,506	204,755
Pocahontas	40,533	52,868	52,564
Southern	120,084	148,149	156,989
Northwestern	84,054	107,665	116,087
Central Western	105,220	130,975	134,868
Southwestern	64,977	78,149	77,193
Total Western Districts	254,251	316,789	328,148
Total All Roads	737,934	911,316	973,152
Commodities			
Grain and Grain Products	36,910	39,953	34,542
Live Stock	20,390	23,252	24,216
Coal	116,212	132,598	137,022
Coke	7,250	10,193	11,699
Forest Products	32,586	57,357	69,152
Ore	6,636	11,479	15,121
Mdse. L.C.L.	223,635	252,631	266,955
Miscellaneous	294,315	383,853	414,445
April 11	737,934	911,316	973,152
April 4	728,511	908,059	958,225
March 28	740,079	885,324	969,196
March 21	741,942	875,385	962,400
March 14	734,262	881,308	958,601
Cumulative total, 14 weeks	10,732,484	13,088,559	14,084,905

The freight car surplus for the week ended March 31 averaged 621,509 cars, a decrease of 417 cars as compared with the week before. This included 298,837 box cars, 252,825 coal cars, 31,644 stock cars, and 14,443 refrigerator cars. For the first week in April the surplus averaged 628,704 cars, an increase of 7,195 cars. This included 299,175 box cars, 259,493 coal cars, 31,231 stock cars and 14,666 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended April 11 totaled 49,714 cars, an increase of 4,392 cars over the previous week but a decrease of 7,507 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
April 11, 1931	49,714	27,924
April 4, 1931	45,322	29,494
March 28, 1931	49,416	30,167
April 12, 1930	57,221	36,737
Cumulative Totals for Canada		
April 11, 1931	702,831	422,533
April 12, 1930	855,761	553,226
April 13, 1929	933,097	649,563



I. C. C. Recognizes Reproduction Costs

Recapture valuation of R., F. & P. made in effort to meet supreme court decision

By Harold F. Lane

Washington Editor,
Railway Age

WASHINGTON, D. C.

THE Interstate Commerce Commission has finally bowed before the decision of the Supreme Court of the United States in the St. Louis & O'Fallon case and on April 21 made public its first final recapture valuation since that decision, in the case of the Richmond, Fredericksburg & Potomac, expressing the conclusion that "both cost of reproduction and original cost must receive consideration in the determination of final value for rate-making purposes."

No explanation is given as to the relative weight accorded these two important factors in arriving at the final value, but the figures given in the report indicate that more weight was given to cost of reproduction—less depreciation—than to original cost, and Commissioner Eastman, dissenting in part, criticizes the report for that reason, but the reproduction estimates are softened to a considerable extent by the use of "period prices," instead of the "spot" prices for each year separately. The period price estimate, as the commission observes, looks also to the conditions prevailing both before and after the years in question, and "averages out the more violent and temporary fluctuations of constructions costs". And the final result reached is a valuation less than half of that claimed by the railroad company.

"We who were of the majority in the O'Fallon decision and also of the majority in disposing of this case may not have changed our minds", said Commissioner Lewis in a separate concurring opinion replying to the partially dissenting opinions of Commissioners Eastman and Mahaffie, "but we feel constrained to accept and follow the decisions of the Supreme Court. If the results, or ultimate effect, of so doing are unfavorable to any interest involved, the responsibility is not ours." He pointed out that a majority of the commission have recommended to Congress certain changes in the law, along the lines of the Howell bill to substitute a "rate base" representing approximately original cost for the valuation, but that the changes have not been made and that the "final interpreter of the law has told the commission that it is 'not to act as an arbiter in economics' but to find value.'" Commissioner Eastman, however in his opinion, reiterated his former objections to giving "weight" to reproduction costs.

Since the O'Fallon decision the commission has made public many tentative or proposed recapture reports, by Division 1 or by examiners, most of them involving short lines but including the Norfolk & Western, in which varying degrees of weight have been given to estimates of reproduction cost and original cost, reduced in proportion to depreciation. The R. F. & P. report however, is the first recapture report since the O'Fallon decision to be issued by the full commission and to be accompanied by a final order for the payment of the recapturable excess found.

The report covers the period from March 1, 1920, to January 1, 1924. Recapturable excess income is found for the year 1922 to the amount of $783,325 and for 1923 to the amount of $1,000,068, but the company has already paid on the basis of its own returns $169,343 for 1922 and $25,647 for the year 1923, so that it is now ordered to pay to the commission within 90 days from April 7, the date of the report, for the "general railroad contingent fund", the balance of half the excess, $222,319 for 1922 and $474,386 for 1923. These figures are based on a final value of $29,600,000 for 1920, $29,700,000 for 1921, $29,400,000 for 1922, and $30,100,000 for 1923.

The R. F. & P. in its return to the commission had stated values ranging from $31,753,255 in 1920 to $46,003,036 in 1923, and had remitted, under protest, the amounts stated above. Later it had filed amended reports stating, a value of $58,000,000 in 1920 and $60,000,000 in 1923 and on these bases showing no recapturable income. At the hearing it had submitted a claim for values ranging from $67,209,210 in 1920 to $62,359,946 in 1923, including ownerhip in the Richmond Terminal Railway.

Final Values Higher Than Proposed by Examiners

The proposed report by Examiners J. V. Walsh and C. H. Johnston, made public last year, on which argument was heard by the commission, recommended values ranging from $27,404,108 for 1920 to $27,945,000 for 1923, and found excess railway operating income amounting to $2,192,393. This proposed report seemed to have been based on the theory of giving "fifty-fifty" weight to cost of reproduction and original cost, less depreciation, but the commission now says that "to base values in all cases upon an equal consideration of cost of reproduction and original cost or on any other fixed proportion would be an artificial rule such as was condemned in the *Minnesota Rate cases,* supra", and that "the valuation of property must always be largely a matter of judgement and not of formula or precise mathematical computation."

Commissioner Eastman, in objecting that the majority has not told how it arrived at the values stated, said that "a description of the process would no doubt be possible, but I question whether it could be phrased in terms of rational thought. Certainly no attempt is made in that direction." Commissioner Lewis offered some explanation by saying that when the values individually reached by each of ten commissioners were brought together "the span between the highest and the lowest was so narrow as to be well within the degree of tolerance generally conceded in valuation matters" and that "with such a basis laid," there was a "final meeting of minds of those constituting the majority."

The method used by the commission in the O'Fallon case, which was condemned by the Supreme Court, ap-

proximated that of a formula to be applied generally, after the commission had held that the value of the property of railroads for rate-making purposes "approaches more nearly the reasonable and necessary investment in the property than the cost of reproducing it at a particular time." In the present case, as no statement is given as the relative weight accorded original cost and replacement cost, there is less indication as to what valuation the commission might arrive at for another property. The nearest approach as to an explanation of its method seems to be included in the following statement at the conclusion of its discussion of "Final Value":

In our findings of the value of the property used by the respondent in the service of transportation during the recapture years we are according such weight to the present cost and original cost of construction as in our judgment is justified by the record. The values found reflect in substantial degree both elements of cost.

The cost of reproduction new of the property, except land, in use by the respondent on December 31, 1920, based on period prices reflecting costs of railroad construction in prior and subsequent years we find to be $35,177,439. During the 10 months of 1920 additions and betterments had been made at a gross cost of $473,590. Eliminating these items, the cost of reproduction on March 1, 1920, was $34,703,849 based on the prices used in the ascertainment of the reproduction cost on the last day of that year. Equating the cost of the additions or retirements in proportion to the time within the period that the items were in or out of service produces the sum of $28,156, which, added to the cost of reproduction at the beginning of the period, results in an average cost of reproduction new for the 10 months of 1920 of $34,732,005. The cost of reproduction less depreciation amounts to approximately $27,000,000. The original cost of the property, except land, at the beginning of the 1920 recapture period was $21,698,736 and the average cost of the property in use throughout the period was $21,726,892. The value of the land used was $3,322,227, from which should be deducted $8,300 for retirements. The investment of the respondent in road and equipment on the last day of the 1920 recapture period, after giving effect to adjustments by our Bureau of Accounts, was $21,856,961.50.

Upon consideration of the foregoing and all other facts of record pertaining to the value of the respondent's property as an economically developed, well maintained, and seasoned railroad, in operation as a going concern, we find the value thereof for rate-making purposes during the period March 1, 1920, to December 31, 1920, to be $29,600,000, including $1,513,252 for working capital. Upon like consideration of the facts pertaining to the values during the succeeding years embraced in this proceeding, we find the values to be as follows:

	Value	Working capital included
Year 1921	$29,700,000	$1,819,552
Year 1922	29,400,000	1,405,000
Year 1923	30,100,000	1,295,000

It will be noted that the cost of reproduction less depreciation plus land would have produced a total of about $30,300,000 or $700,000 more than the final value found for 1920, whereas the original cost plus land would have produced only about $25,000,000. The effect of using period prices instead of yearly prices is shown in the report by a table in which the cost of reproduction new as of 1920 prices is shown as $42,665,395, as compared with the $35,177,439 obtained by the use of period prices. But in 1923 the yearly prices produced a total of $37,369,546, as compared with $36,341,806 at period prices.

In its discussion of the period prices used in estimating cost of reproduction the report says that, taking 1914 as a base, or 100, prices for railroad construction in 1916 rose to 118, in 1917 to 147, in 1918 to 177, in 1919 to 196, and in 1920 to 220. In 1921 the index had dropped to 175 and in 1922, to 160, to be followed by an advance to 180 in 1923. Since 1923, the fluctuations or changes in costs of materials have been less noticeable than during the preceding eight years. This is shown by the indexes of 179 in 1924, 171 in 1925, 172 in 1926, and 171 in 1927 and 1928. The commission also takes judicial notice of the fact that a recession has taken place since 1928, and that the index for 1930 was approximately 164.

In the discussion of final value the report says the railroad had contended that dominant weight should be given to reproduction cost to the complete exclusion of original cost and that the National Association of Railroad and Utilities Commissioners and the National Conference on Valuation of American Railroads had adopted a contrary view but had been unable to state the respective weights that should be given in this case. After discussing the various decisions of the Supreme Court the commission said that in the St. Louis & O'Fallon case the court had annulled its valuation of that road because it believed that no consideration had been given to cost of reproduction, but expressly stated that the weight to be accorded thereto was not before it. "It is unreasonable to suppose", the commission says, "that this important question would have been dealt with in this way had the court found as little difficulty as respondent in accepting the view that cost of reproduction must be taken under ordinary circumstances as the equivalent of value. In no case to which our attention has been directed has the Supreme Court of the United States ruled as to the specific weights to be given to these elements. On the contrary its decisions clearly indicate that they may well vary according to the conditions affecting different railroads."

Various Contentions of Carrier Overruled

In addition to fixing the valuation the commission overruled many incidental contentions of the railroad company. One of these was that original cost is immaterial in this proceeding. Another was the exception to the use of estimates in the determination of original cost. The respondent's contention that there is no justification for deducting from original cost the depreciation found to exist in the property was overruled. The company had claimed $9,294,391 for going-concern value and from $6,000,000 to $7,500,000 as a reflection of the earning power of the property due to its strategic location, favor of connecting roads, diversified traffic, traffic growth, efficient organization, and good reputation, but the commission declined to make any addition to the final valuation on account of them.

The company also, while adhering to the theory that no depreciation existed in its property, contended that if depreciation is nevertheless deducted in determining the value, charges consistent with the deductions made must be taken into account as on operating expense in determining income, and deductions from income for depreciation were sought based on replacement cost rather than original cost, and applicable to roadway items as well as equipment. The commission held, however, that Congress had based its recapture provisions upon the net railway operating income as understood according to the commission's classification of accounts and that it must have fixed the rate of 6 per cent as a fair return for recapture purposes after considering the net railway operating income stated in accordance with the classification of accounts and not on the basis for which respondent contended. If this is inconsistent, it said, the inconsistency is inherent in the law and not a result of its application of its terms.

Mahaffie Urges Consideration of Yearly Prices

Commissioner Mahaffie dissented in part, saying that the values found for the years other than 1920 appeared to him to be within the range of a reasonable judgment after consideration of the various elements required by the law to be considered, but that as to the value for 1920 too little weight had been given to the prices cur-

rently prevailing. Pointing out that prices of railway construction in 1920 were 220 per cent of the 1914 prices and that in 1922 they had receded to 160 per cent he said the majority had used a method of pricing that resulted in the acceptance of figures showing almost no difference in the cost of reproduction new of the property of the carrier as between 1920 and 1922. "Since we must find the value for 1920," he said, "and, in finding it, must give consideration to the cost of reproduction, it follows that we must consider that cost as of 1920. In other words, current prices must be considered and not merely prices prevailing before and after the year in question." He also said:

The report fails fully to disclose the methods employed in determining the period prices used in the Bureau's reproduction estimates. As I understand it, these period prices are not a composite of prices for the various primary accounts embraced by the inventory arrived at by a common method, but are the result of applying different methods to the various primary accounts. For some of the accounts the peak prices current in 1920 have been considered, whereas for other accounts the 1920 prices appear to have been disregarded. For some accounts the period embraces the years with which we are here concerned and for other accounts the prices of years both prior and subsequent thereto have been given effect.

When reproduction cost estimates are based upon prices determined in this manner we are not in a position to exercise proper judgment as to the weight which should be given "to prices and wages prevailing at the time of the investigation" in ascertaining value. On the other hand, where, as here, we have before us reproduction cost estimates based upon spot prices for a series of years, we not only have data with which to make our ascertainment for a particular period, but also an indication of the trend or permanence of prices. If they are deemed insufficient properly to develop the trend the record should, of course, be supplemented. In the first instance, we are dependent upon others for judgment as to the weight which shall be given to the trend. In the latter instance we, ourselves, perform that function.

With spot prices before us we have evidence necessary to determine value upon any theory. In my judgment the majority errs in failing to give consideration to them.

Commissioner Eastman, after a lengthy discussion as to the meaning of various Supreme Court decisions, said that while it required the "consideration" of cost of reproduction the "weight" to be accorded the various elements of value is a matter of judgment and that he would add to the best possible estimate of the reasonable original cost of existing property a fair allowance for working capital, deducting an allowance for depreciation based on the best available evidence as to exhaustion of service capacity. On this basis, he said credit would have been maintained because the rate base for 1922 would be about $20,850,000, which would have left the carrier with about 10.7 per cent on its outstanding capitalization, after recapture, or about 8.2 per cent if a stock dividend be included in the capitalization.

Commissioner Lewis in his separate concurring opinion explained at some length how he had arrived at his conclusion of value, saying in part:

In the case before us the carrier produced no tangible evidence of value. It simply contends for a theory and that theory does not appeal to me to be rational. As for myself, I have given weight to both cost to reproduce and original cost, in the proportions which I judge to be proper, and it seems to me that in doing so, came to a conclusion fair to both the carrier and the public. On the one hand, the higher cost to reproduce soars the greater the weight that should be attached to it; on the other hand, if reproduction cost should drop so low as to cross the carrier's line of investment (which is now occurring) the original cost factor should tend to prevent results possibly detrimental to both the credit of the carrier and the service to the public.

Other commissioners may have adopted different methods and applied different weights to the reproduction factor in arriving at their conclusions. But all of the majority did give what they considered to be due consideration and weight to reproduction cost as of each of the recapture periods involved. The single sum value arrived at was a determination reached by the exercise of informed judgment based on the record.

Southern Has Difficult Year

THE SOUTHERN RAILWAY, to use the words of its own annual report, in 1930 "had no immunity from the difficulties which have beset industry and agriculture." Its freight traffic, as measured in revenue ton-miles, declined 14.17 per cent from 1929 and its passengers carried one mile by 22.07 per cent, bringing a decline in the revenues from the two services of 14.97 per cent and 22.15 per cent respectively.

Operating revenue totaled $118,868,608—a decrease of 16.98 per cent, which was offset in part by a reduction in operating expenses—so that the decline in net operating income was restricted to 42.45 per cent of the loss in gross revenue. The operating ratio rose from 71.73 in 1929 to 75.01 in 1930, and the transportation ratio from 32.57 to 35.23; while the maintenance of way ratio declined from 14.80 to 14.38 and the maintenance of equipment ratio rose from 18.53 to 18.75. In spite of the rise in the transportation ratio—to be expected with the great reduction in traffic—the report points out that

(*Continued on page 810*)

Table I—Comparison of Selected Freight Operating Statistics

	1930	1929	Per cent of change Inc	Dec.
Mileage operated	6,676	6,679		.04
Gross ton-miles (thousands)	21,667,405	24,512,862		11.6
Net ton-miles (thousands)	8,369,875	9,799,681		14.6
Freight train-miles (thousands)	15,958	17,663		9.7
Freight locomotive-miles (thousands)	16,568	18,429		10.1
Freight car-miles (thousands)	602,662	682,662		11.7
Freight train-hours	1,082,904	1,242,037		12.8
Car-miles per day	24.4	28.2		13.4
Net tons per loaded car	22.0	22.2		0.9
Per cent loaded to total car-miles	63.3	64.7		2.2
Net ton-miles per car day	338	404		16.3
Freight cars per train	38.7	39.6		2.2
Gross tons per train	1358	1388		2.2
Net tons per train	524	555		5.6
Train speed, miles per train hr.	14.7	14.2	3.6	
Gross ton-miles per train-hour	20,009	19,736	1.4	
Net ton-miles per train-hour	7,729	7,890		2.0
Lb. coal per 1,000 gross ton-miles	151	155		2.5
Loco. miles per loco. day	46.8	52.7		11.1
Per cent freight locos. unserviceable	16.3	13.2	23.5	
Per cent freight cars unserviceable	12.5	10.6	18.0	

Table II—Southern Railway—Earnings and Traffic Volume, 1917-1929

Year	Average miles operated	Operating revenues	Operating expenses	Operating income	Balance after charges	Revenue ton miles (thousands)	Receipts per ton per mile (cents)
1917	6,983	$90,716,569	$60,113,598	$26,429,962	$14,037,415	6,516,208	0.897
1918	6,983	126,574,297	91,810,425	30,976,625	5,708,913	7,234,628	1.053
1919	6,984	129,787,812	113,744,813	11,926,598	5,141,567	6,303,441	1.298
1920	6,973	152,817,410	131,236,149	16,890,016	1,716,149	8,229,651	1.219
1921	6,971	128,715,150	105,829,007	18,218,807	2,019,370	5,563,470	1.531
1922	6,971	128,489,847	97,170,133	20,472,778	8,823,797	6,512,961	1.353
1923	6,971	150,467,985	112,414,259	28,128,136	15,136,998	8,123,383	1.298
1924	6,868	142,486,514	102,674,674	30,442,719	17,769,140	7,585,374	1.316
1925	6,873	149,313,891	103,811,951	35,086,021	22,579,172	8,273,604	1.291
1926	6,795	155,467,975	107,866,588	35,528,783	23,596,721	9,023,254	1.250
1927	6,771	147,639,062	103,907,953	32,765,062	21,699,907	8,482,575	1.289
1928	6,760	144,116,452	101,887,718	30,842,554	19,267,132	8,412,608	1.291
1929	6,731	143,183,948	102,701,588	30,030,977	18,128,788	8,350,518	1.293
1930	6,731	118,868,608	89,162,916	19,708,163	9,126,513	7,167,545	1.281

Present-Day Maintenance Problems and the Engineer*

A discussion of the changed conditions in railway engineering and maintenance and the part being played by mechanical equipment and advanced technical skill

By George J. Ray

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AS engineers it is our duty to help advance new methods when they will improve conditions and reduce costs, or be the means of furnishing the people safer and better service. The extent to which we can use machinery for handling our work depends not only upon the cost of the new equipment and the amount of labor to be saved, but to a very great extent upon the price of the labor.

Some of the more important matters affecting maintenance of way methods and costs are increased size, axle loads and total weight of locomotives, increased size, capacity and axle loads of freight cars, increased speed of freight trains, increased prices of materials and supplies, and increased wages paid employees. The requirements of the service have also made it necessary to provide better riding and safer track, safer structures, cleaner and more presentable surroundings, and extensive protection for the safety of operation in the form of added signals, interlocking plants and train control.

The work required of the engineering and maintenance departments of the railways has gradually increased in many ways. I refer to additions and improvements to the physical property in the way of additional industrial tracks, added main tracks, sidings and yards to make for cheaper operation; and new and larger shops, enginehouses and turntables to take care of the requirements of larger power. Such facilities, while added to reduce the cost of operation and of locomotive and car repairs, necessarily increase the cost of maintenance of way and structures. The heavier and larger power of recent years has necessitated the enlarging and strengthening of bridges and a more substantial roadbed, added drainage, heavier rail, and larger and more crossties have become necessary as the weight of equipment and the speed of trains have increased.

The larger equipment and height and width of loading have made it necessary to increase the side and overhead clearances of rock cuts, tunnels, bridges and other structures. Better and cleaner ballast is required to carry the present-day fast traffic with heavy wheel loads. This means that ballast must be cleaned more often. In the old days, and especially in the country districts the easiest and cheapest way to get rid of dirty ballast was to raise the tracks enongh to get a layer of clean ballast under the ties. It is not so easy now. Fixed grades due to permanent bridges, overhead and grade crossings, etc., often make it necessary to dig out the dirty ballast and screen and replace it without changing the grade of the tracks.

George J. Ray

The Rail Problem

Heavier axle loads and the increased wear due to such loads have made it necessary to use heavier and better rail. We hear much about the rail problem, but I doubt if many understand the importance of the subject. The heaviest rail sections now in use are undoubtedly of ample girder strength to carry present-day wheel loads. Nevertheless, we have more rail failures than we should, due to a combination of the severe service requirements to which the rail is subjected and the fact that the art of manufacturing rail has not yet developed to a point where we can be sure of the quality of the rail or its ability to stand up under present-day operation.

I am convinced that the constantly increasing average load imposed on the 33-in. freight car wheel is the most serious problems with which the engineer has to contend. The large capacity freight car is economical and is here to stay. Nevertheless, I believe we have just about reached the limit of wheel loads for the standard 33-in. freight car wheel. It is interesting here to note that the diameter of the freight car wheel is about the only thing on the entire railroad, certainly the only part of a car, that has not changed since centennial year. It is indeed unfortunate that the diameter of these wheels was not increased materially many years ago. The area of contact between the present wheel and the rail is so small that the contact load per square inch is very high. Under the present situation, the big problem is to find a rail steel of sufficient strength and toughness to stand up under this punishment and, at the same time, be safe from a breakage standpoint.

Some engineers have already reached the conclusion that it will be absolutely necessary to go to heat-treated steel in order to overcome some of our present difficulties. At the present time the manufacturers are not in a position to heat treat any quantity of rail and the cost is excessive. Heat-treated rail for one-fourth of the track mileage of the country at the present price of such rail would mean an added capital expenditure of about $350,000,000, and would

* An abstract of a paper presented before the New England Railway Club, at Boston, April 14.

increase annual operating expenses by at least one-tenth of that amount.

With High Prices, Long Life Is Necessary

Increased wages and the increased cost of materials make it essential to extend as far as possible the life of all materials. For many years engineers have known the importance of treating ties and bridge timbers, but so long as wages were low and the supply of timber adequate at low cost, money could not be secured for the added cost of treatment. Thirty years ago, when I was a track supervisor on the St. Louis district of the Illinois Central in southern Illinois, we paid $0.31 each for No. 1 ties (now No. 5). With such prices for white-oak ties it is little wonder that the managements were slow in going into the treatment of cross-ties. Today, few white-oak ties are available at any price and even with the present depressed conditions the long-leaf yellow pine heart ties cannot be purchased in this part of the country for less than $1.20, to which must be added the cost of handling and treating. The average cost of a treated tie is now over $2. The cost of placing ties in the track is from three to four times as much as it was 30 years ago, so that the cost of a treated tie in the track becomes a very substantial item. It is, therefore, essential that every possible precaution be taken to prolong the life of the tie, saving not only the cost of the tie, but the interest on the cost of installation.

It took railway managements a long time to understand the importance of tie plates and it was not until after there was more or less general use of treated ties that the value of the heavy, substantial tie plate was realized. A great deal of money has been wasted on tie plates of insufficient thickness and poor design and I dare say that there are still tie plates in more or less general use that should not be applied to treated timber. Tie plates that split and cut into the wood are a means of accelerating decay and the general destruction of the tie.

Between 1909 and 1924 we used various weights of rail from 90 lb. to 118 lb., all with the same rail base, 5⅛ in., laid on heavy tie plates. In 1925 we started the use of 130-lb. R. E. section rail with a 6-in. base, and it was then necessary to change our tie plates throughout with the laying of new rail. Changing over to the 130-lb. plate attached to the tie with screw spikes is going to increase the life of our treated ties materially.

The general use of tie plates accentuated rail creeping, with the result that we have had to go to the extensive use of anti-creepers. Six or seven anti-creepers on 130-lb., 39-ft. rail are generally sufficient to prevent creeping without slot spiking in the joints. We got away from slot spiking 10 years ago and feel that in this one step we made a marked improvement in our method of maintaining tracks. We use symmetrical joint bars with a joint base plate of the same section as the tie plates. This base plate holds the joint ties rigidly in position and permits the rail to move freely through the slot in the plates.

Many Bridge and Signal Changes

In the reconstruction of bridges, consideration has had to be given to the question of clearances as well as to that of the increased axle and total loads of engines and cars. The use of the reinforced concrete slab has made it possible to eliminate many steel structures and thus provide a roadbed free from girders, resulting in safer operation and making it possible to use turnouts or crossovers on the bridges which, ordinarily, cannot be done on steel structures.

Increased traffic has made it necessary to extend widely the use of automatic signals and interlocking plants. On top of this the government has seen fit to require the more or less extensive use of train control, so that today the signal and interlocking maintenance on a railroad with heavy traffic has become a very complicated and expensive part of maintenance work. In 1909, the first year I was chief engineer, we spent $119,887.72 for the maintenance of signals and interlocking as compared with expenditures of $569,568.15 in 1930. Even after taking into consideration the increased rates paid labor and the higher prices of materials in 1930, it is still true that the burden of signal maintenance doubled during the period. This illustrates plainly the rapid growth in this very expensive phase of maintenance work.

Mechanical Equipment Used Extensively

In order to handle efficiently the constantly increasing amount of work required of the maintenance of way department, it has become necessary to employ every efficient mechanical devise. This has been made all the more necessary on account of the high wages now paid to all classes of men in railroad work. [At this point Mr. Ray discussed at some length the necessity for, and the value and economy of a wide range of mechanical equipment and devices used by the maintenance of way and structural forces. Some of the more important units mentioned were industrial cranes, ballast cars, air-dump cars, motor cars, power bonding drills, air compressors, pneumatic track and bridge tools, tie scoring machines, track and bridge-welding equipment, ballast-cleaning machines, track-lining devices, tie-adzing and boring equipment, track-oiling equipment, the cement gun and motor trucks.—Ed.]

By means of good equipment we have found it possible to increase materially the territory covered by some foremen. Under a capable foreman we have found that much more efficient work is done with a large gang, equivalent to two normal sections, thus giving the foreman ample men to handle all phases of his work. The fact of the matter is with the heavy track construction now in general use a larger number of men in the gang is required for certain essential elements of track maintenance. With 130-lb. rail and screw-spike construction the ordinary section gang cannot line track. It is absolutely essential to have a large gang to do such work and where the foreman has the necessary ability it will be found that a marked saving can be made by giving him the necessary equipment and men. Every section that is cut out eliminates one motor car, the flagman necessary in handling track work and reduces the number of slow orders required.

Engineer Has Effected Large Economies

Thus far I have attempted to give you a rough idea of what the railway engineer is up against and what he has done in the way of keeping pace with the changed conditions brought about by faster and increased traffic and heavier equipment. Let us see what part he has played in saving money for the railroad and in keeping down the operating ratio.

Through various publications such as those of the Bureau of Railway Economics and the Year Book of Railroad Information published by the Committee on Public Relations of the Eastern Railroads, the public is given a mass of data covering the vast expenditures, operating statistics and other information in detail to show that the railroads are being operated efficiently and the public furnished cheap and fast service. However, I have been unable to find any reference in these

publications to savings effected through increased efficiency of the engineering department. Let us see whether these statistical bureaus have overlooked a chance to claim efficiency in the operation of the railroads due to economies inaugurated and carried out by this department.

Take the item of ties for example: The records show that there has been an increase of 5½ per cent in the mileage of all tracks from 1920 to 1929 inclusive. In spite of this increase there was a reduction of 15 per cent in the number of ties applied in maintenance. Tie statistical records indicate that there was a reduction of 12,000,000 ties used in maintenance in 1929 as compared with 1920, a reduction of 20,000,000 to 30,000,000 ties from those used in the years from 1907 to 1911 inclusive. This marked reduction, which was made in spite of the increased track mileage, was due to the constantly increasing number of treated ties being placed in the track and the various improved methods adopted in track construction.

In addition to the saving in the cost of the tie there was the added saving in the cost of placing it. It must not be overlooked that a tie saved at this time must be figured at the present cost of ties and that the labor required to place ties in the track costs an average of 40 cents per hour, as compared with 15 cents per hour 20 years ago. It is, therefore, safe to say that the railroads as a whole are now saving at least $40,000,000 per annum in tie renewals due to improved methods and the treated ties which have been placed in tracks in prior years. Furthermore, a very marked saving has been made through the proper concentration, reclamation and utilization of second-hand materials.

Increased Maintenance Costs

Considering the railroads as a whole, the total charges to operating expenses for maintenance of way and structures are gradually increasing. In order to determine any marked savings effected by efficient maintenance methods in view of this, it becomes necessary to make a rather complete analysis of the various accounts. Furthermore, it is the general practice to consider any marked falling off in maintenance charges as an evidence of deferred maintenance and it is generally wiser, therefore, to talk about expenditures, which are more readily explained than deferred maintenance.

In periods of depression, it always has been and probably always will be the general practice to reduce maintenance of way and structures expenditures severely. The records indicate that for all Class I roads during the year just closed, 1930, traffic was off approximately 14 per cent as compared with 1929. Maintenance of way expenses declined 17.5 per cent, maintenance of equipment 15.3 per cent and transportation expenses 11.3 per cent. From the above figures one might assume that there was deferred maintenance. On the other hand it is quite certain that the liberal expenditures for maintenance during the preceeding years of good business had put the roads as a whole into a condition whereby they could easily stand a sharp cut in maintenance expenses with the falling off in business in 1930.

I stated previously that the operating expenses for maintenance of way and structures are gradually increasing over a period of years. In spite of this, the maintenance of way and structures expenses are still only a small part of the total operating costs, being 13.62 per cent in 1929. On the other hand, a very large part of the total railroad investment is in roadway and structures, approximately 67½ per cent from two-thirds to three-fourths of the net annual expenditures for additions and betterments is chargeable to roadway and structures. Thus, the roadway property to be maintained is increasing at a rapid rate. In spite of this rapid increase, the maintenance ratio is only slightly higher today than it was 20 years ago. The maintenance ratio for all Class I roads was 13.10 per cent in 1910, and reached a maximum of 16.71 per cent in 1920. It dropped to 13.62 per cent in 1929 and went as low as 13.34 per cent in 1930.

The main object of making heavy expenditures for additional tracks, yards, terminals and incidental facilities is for the purpose of increasing traffic or reducing the cost of operation. In either event, such additional expenditures necessarily add to the physical property, thus increasing the cost of maintenance.

More Signals to Maintain

The adoption of heavier motive power often makes it necessary to increase the length of turntables and requires the construction of new and larger enginehouse and other facilities for handling the heavier power. These additions not only add to the physical property which must be maintained by the maintenance of way organization, but increase the expense of maintaining the main line and terminal tracks used by such power. Large expenditures have been made in recent years for additional signals, new and improved interlocking plants and train control for the purpose of improving and increasing the safety of operation.

The cost of maintaining these specific improvements has grown at a very rapid rate. As an example, the Lackawanna's maintenance expenditures for signals and interlockings in the year 1909 totaled $120,000. This item grew to $570,000 in 1930. During 1909 our net addition to capital investment for signals and interlockings amounted to $127,500, while the addition for such facilities in 1930 was $874,000. A careful check indicates that the factors which must be applied to the expenditures for labor and material on signals and interlockers for 1914, to make the expenditures of that year comparable with the expenditures for 1930, are 2.51 for labor and 1.65 for material. The divisions between labor and material for this account are 78 per cent and 22 per cent, respectively. We thus find that we must multiply the expenditures of 1914 by 2.32 to make them comparable with those of 1930. Assuming the labor factor for 1909 to be the same as for 1914, we arrive at a comparative expenditure for signals and interlockers of $278,000 for 1909, and $569,500 for 1930, showing that the work performed for this account alone in the latter year was more than double what it was 20 years earlier.

The Interstate Commerce Commission's report for 1930 shows an increase in the total investment of all roads, from 1910 to 1929 inclusive, of 77.8 per cent. I have no figures available showing the net investment in road and structures for 1910, but it is evident that the road and structures property to be maintained at the present time has very largely increased over what it was 20 years ago.

Maintenance Expenses Lower Relatively

The cost of roadway and structures on the Lackawanna, exclusive of engineering and land, in service on December 31, 1909, was $101,172,236. This total was increased by additions and betterments, from 1909 to June 30, 1918, by $43,713,054, and was further increased between June 30, 1918 and December 31, 1929, by $38,740,897, making a total cost of railroad property,

exclusive of engineering and land, as of December 31, 1929, of $183,626,187. This figure indicates an increase of 81 per cent from 1909 to 1929. If we add 81 per cent to the maintenance of way and structures expenses for 1909, we secure a figure of $5,970,000 as compared with an actual expenditure in 1930 of $6,788,000.

I think it is fair to assume that for the entire maintenance of way and structures account we should add a factor of 1.5 to material and 2.0 to labor to make the 1909 expenditures comparable with those of 1930. Our records indicate that a fair division between labor and material for the entire roadway and structures account over a period of years is 60 per cent for labor and 40 per cent for material. Applying these factors to the equated expenditure for 1909, given above, that is, $5,970,000, we get a figure of $10,746,000 as the equated expenditure of 1930, compared with an actual expenditure of $6,788,000.

The above figures indicate a very large saving in maintenance expenses, which may be explained as follows:

In the first place, prior to 1914 when the Interstate Commerce Commission fixed the method of handling accounts, the Lackawanna made annually large appropriations from current earnings for improvements and charged a very considerable amount of such improvements to operation. In the second place, the improved methods of construction and maintenance adopted in years past have resulted in a very large saving in the cost of maintaining the railroad in recent years.

A review of the Lackawanna's charges to operating expenses for maintenance of way and structures for 1909 as compared with 1930, shows the main labor accounts about 2½ times as high in 1930 as they were in 1909. Other items showing very marked increases were Superintendence, Other Track Fixtures, and Signals and Interlockings, as already indicated. The increased charge to superintendence, in addition to the higher wages paid, was due to a greater effort to provide more and better supervision over all men. The marked increase in the charge to other track fixtures was due to the fact that we are now in the midst of changing the weight of our main track rail.

As I have already stated, new tie plates were required for the 130-lb. rail and, as we had heretofore protected all main-line ties with heavy tie plates of approximately the same weight as the tie plates now being placed, there has been a very heavy charge to operating expenses for the 130-lb. plates. We also find that there has been a very marked decrease in the expenditures for bridges, trestles, culverts, ties and ballast.

Low Maintenance Ratio on the Lackawanna

The maintenance ratio on the Lackawanna averaged 11.24 per cent for the seven years, 1909 to 1915 inclusive, and 9.8 per cent for the ten years, 1921 to 1930 inclusive. During the last eight years it has been under 10 per cent. These figures compare with an average maintenance ratio for all Class I roads for the six years 1910 to 1915 inclusive, of 13.04 per cent, and for the eight years 1922 to 1929 inclusive, of 13.48 per cent.

The low maintenance ratio on the Lackawanna as compared with the railroads as a whole can be accounted for as follows:

1—A comparatively high traffic density.
2—The replacement of all wooden bridges on all parts of the road with concrete, steel, or concrete and steel structures.
3—Buildings constructed of high class materials and with the view of reducing maintenance costs.
4—High grade materials for all parts of the track structure.
5—The creosoting of all track and bridge ties as well as heavy timbers with the maximum amount of good creosote.
6—A carefully planned program for improving track conditions in general, and the application of materials and fixtures with the view of extending the life of ties and other materials over as long a period as is consistent with good and safe track.
7—Ample supervision.
8—Fair and satisfactory treatment for subordinate officers and the rank and file in the maintenance department.
9—A disposition on the part of officers and employees alike to carry out instructions and to perform their work in an economical manner.
10—The application of up-to-date machinery to all classes of maintenance of way work.

Southern Has Difficult Year

(*Continued from page 806*)

controllable components of this ratio were kept well in hand. For instance, gross ton-miles per train-hour rose 1.38 per cent; train crew wage cost per thousand gross ton-miles declined 1.72 per cent; coal consumption per thousand gross ton-miles was reduced by 2.58 per cent. Other details of freight service performance drawn from sources other than the annual report are shown in Table I.

The net income of the company for the year was $9,126,513, as compared with $18,128,788 in the preceding year. After the payment of $3,000,000 (5 per cent) as dividends on the preferred stock there was left a balance of $6,126,513, equivalent to $4.72 per share of common stock, as compared with $11.65 per share earned in 1929. Regular dividends of 8 per cent were maintained out of surplus—an action justified by the fact that the company had in the six years prior to 1929 distributed to common stockholders less than half of the income available for this purpose. Dividends of $2 payable May 1 this year and $1.65 payable August 1 were likewise voted out of unappropriated earnings of 1929. Further dividend policy will be considered by the directors at their meeting in June. Substantial contribution to the Southern's earnings is made by non-operating income which totaled $5,785,190 in 1929 and $7,236,159 in 1930, the increase being due largely to increased dividends declared by subsidiary companies. The company had available for interest on funded debt, equipment trusts, etc., 1.62 times the amount of such charges.

The net increase in the property investment during 1930 was $5,044,549, mainly confined to smaller projects. New freight stations were built at Durham and Lexington, N. C. Several fuel handling and water treating plants were installed. Industrial development in the railway's territory proceeded, although production was curtailed. Agriculture suffered both from low prices and drought, but dairying continued to expand.

Table II shows revenues, expenses and traffic of the system for the past 14 years. It will be noted that both operating revenues and operating expenses in 1930 were the lowest since 1917. Operating income was lower than that of any year since 1921 and the balance available for dividends was the smallest since 1922. The total of revenue ton-miles, however, was but slightly under that for 1924. The year 1926 was the banner year for traffic and earnings—the high peak attained in that year being co-incident with the Florida boom.

(*Continued on page 814*)

Intelligence Will Conquer Crisis*

Railroad problem not insoluble—Responsibility lies with management, government and public—Co-ordination promises benefits

By General W. W. Atterbury
President, Pennsylvania

SINCE the present decline in general business began to be taken seriously, it has become quite common to hear much concern expressed as to the situation in which our railroads find themselves and their outlook for the future. My opinion is that the tendency to single out the railroads in this manner and differentiate them from other forms of industry and enterprise is unwarranted. It is true, of course, that the railroads have their peculiar problems but that is true of nearly every other form of business.

In a broad way, however, the effect of the business depression upon the railroads has been much the same as upon industry and commerce in general, and when conditions improve in this country and abroad we shall find our railroad traffic and earnings picking up pretty much as we shall find the production of our steel mills, our coal mines and our automobile plants.

Intelligence Will Solve Problem

As to the special problems with which our railroads are confronted, I think the most important thing to be said and understood about them is that none of them is insoluble or insurmountable if we approach them and deal with them in an intelligent way. To do so is partly the responsibility of the railroad companies themselves, partly that of the government and regulatory authorities, and partly that of the public.

Perhaps the nature of these special problems may be suggested in a general way by saying that it is just as possible to have an over-production of transportation as it is to have an over-production of industrial and agricultural products or commodities.

I do not wish to be understood as saying that in my opinion we have actually reached that condition. On the contrary, while I feel that we have an abundance of transportation facilities, I also believe that ultimately we will need and profitably use them all. Our real requirements are to introduce order into the present situation, check wasteful competition and duplication of service, and obviate the too rapid creation of additional facilities for furnishing commercial transportation in advance of the country's needs.

Railroads are, and must long continue to be, our most important means of transport. They are highly regulated by federal authority—in many respects restrictively. Other forms of transport, including highway, waterway and airway, are not so regulated, or only to a minor degree.

Railways Barred from Waterways

The situation is further complicated by the fact that the government is directly subsidizing transport upon the inland waterways and has barred the railroads from their use, while it forces them to establish through rates with barge lines which the government owns and operates at rates less than the true cost of the service. The effect of this is to force the railroads to short-haul themselves and make inroads into their own revenues. A further discriminatory condition results from the Panama Canal Act prohibitions, which have practically driven railroads from participation in coastal, intercoastal and Great Lakes shipping.

Two important developments will have an extremely helpful effect upon the general transportation situation. One is the co-ordination of transport, to the end that the different agencies for rendering service—railways, highways, airways and waterways—may each serve the public best in the field for which it is most particularly adapted. For proper realization of these advantages it is essential that the railroads be relieved from the discrimination which they now suffer from unregulated and subsidized competition, and freed of the legal restrictions which bar them from engaging in shipping between domestic seaports and on the inland waters.

The second development is consolidation of the railroads among themselves into a smaller number of strong systems, by which it will be possible to serve the public better and more efficiently than with the present multiplicity of carriers in the field.

P. R. R. Going Far With Co-ordination

With respect to the co-ordination of transport it is possible to point to real progress as an achieved fact. On the Pennsylvania we have been engaged in the co-ordination of highway transport with our rail service since 1923. We are utilizing trucks under contract to replace peddler or local freight train service on lines of light traffic, and have acquired interests in the trucking companies. We are engaging extensively in passenger bus operations.

Between important cities on our lines we have established a specialized service for less-than-carload freight, utilizing portable steel containers. Mounted on trucks they operate between the rail stations and the store-door of shipper or consignee. On specially equipped flat cars they perform the line haul between cities. This is almost an ideal illustration of co-ordinated service.

We believe it is possible to carry much further the work of bringing highway transport into harmony with our rail service and to bring back to the rails a very considerable portion of traffic which has temporarily been lost to them. We expect to do this without any injury whatever to sound commercial highway transportation. On the contrary, our plans contemplate increased profit both to the highway carrier and to the railroad.

The co-ordination of airplane service with our railroad is a matter with which I think most of you must be generally familiar. You will recall that in the summer of 1929 we started the first coast-to-coast 48-hour rail-air service between New York and the Pacific Coast, involving combined use of planes and trains. This has since been much improved, and the operating company, in which we hold a substantial interest, added a supple-

* From an address delivered before the Bond Club of Philadelphia on April 21.

mentary all-air passenger and mail service of 36 hours, with an over-night stop. This has now been cut to 24 hours for mail, and, with completion of the lighting of the airways, that reduced schedule will also be extended to passenger service.

In the field of ocean transportation, the Pennsylvania Railroad has invested in two shipping lines operating between Atlantic Coast and European ports. The Panama Canal Act, of course, does not interfere with this service. We once operated a splendid line of vessels on the Great Lakes, and should like to do so again if the Panama Canal Act restrictions were removed.

We believe also that we should be free to use the inland waterways upon the same terms as any other corporations or individuals, and that the present legal prohibitions against so doing should be removed.

Four Party Plan Nearly Ready

On the subject of consolidation, I will merely say that the Four Party Plan for the Eastern Railroads is intended to carry out the provisions of the Transportation Act of 1920 in so far as this territory is concerned. Its provisions will be formally submitted to the Interstate Commerce Commission in the near future. Nothing is more essential than that the Commission, which by law is the arbiter in this matter, should be allowed to reach its conclusions without political or other interference, and arrive, without pressure or coercion, at a determination which it believes to be in the true public interest.

Now for a few words as to the general business situation. The present decline in commerce, as distinguished from that of security prices, really began in the late spring or early summer of 1929. It has therefore been under way nearly two years, and precedent certainly favors the hope, in which I am glad to share, that we are scraping bottom, and that the trend should in the not far distant future be expected to turn upward.

It is evident to all informed people that no country in the existing state of the world can be self-contained, and that the impediments to international trade are one of the greatest obstacles in the way of commercial recovery. We are today a great agricultural and industrial nation, with our ability to produce far in excess of our ability to consume, and with gold reserves far in excess of our requirements, and, because of our international relations, we are unable to use our great credit system, or our surplusage of production to advantage, not only to ourselves, but to the world at large.

[Here Gen. Atterbury quoted extensively from an address delivered by Owen D. Young before the National Electric Light Association in San Francisco, June 19, 1930.]

World-Wide Conditions Important

I have great admiration for the business men of this country, for their energy, their enthusiasm, and for the unquestionable sincerity with which they are working at the present time to sustain employment and avoid reduction in wages. Yet I cannot help feeling that there are certain fundamentals, some in the world situation, some here at home, which must be corrected before we are put on a sound and substantial basis. I also question whether they are receiving the attention they deserve—whether we are thinking deeply and basically enough. To mention some, the following occur to me at the moment:

1. The maldistribution of gold; its consequent effect in restricting the use of gold as the basis of credit and currency, and the further result of inflating the price of gold, which is only another way of saying depressing the price of commodities. Commodity prices this month, according to the index of "The Annalist," reached the lowest level since 1914.
2. The war debts, which apparently must be paid either in gold or goods, both of which we, in the United States, seem currently to possess in surplus measure.
3. The tariff walls which nearly all nations are building against one another, tending to separate the different countries into hermetically sealed compartments, so far as commerce is concerned, and further complicating the problem of the war debts.
4. Installment buying, particularly as it has been developed in this country.
5. The question of whether we are not trying to reduce our own national debt too rapidly (over 9¼ billions of dollars in ten years) and whether we might not justly defer somewhat more of it to another generation.
6. High taxation everywhere, and much of it on unsound principles; in this country, particularly, our capital gains tax.
7. The effects of the Federal Trade Laws and the Sherman Anti-Trust Act.

As to this last item, suppose we take, as an example, the coal industry, of which I have been a close student for nearly forty years. In a big way, the industry has never been prosperous in this country unless there has been a coal strike either in Germany or England. In a small way, it has never been prosperous except by reason of car shortages occasioned by poor transportation conditions, or railroad strikes, or coal strikes in one or more of our own coal producing areas, in which event one or more regions would suffer badly as an offset to the prosperity of the others.

Coal Industry Needs Attention

I know of no basic industry where over-production is so serious a matter, or where the possibilities for improvement are present, within reasonable range, but for violation of the laws referred to. That there should be reduced production, by agreement, is essential to the protection of the industry at home; but it should go farther, and the coal industry of this country should be in position to deal with the coal industries of Great Britain and Germany in order to bring about improvement in both of these countries, because their conditions are quite as serious as our own.

We will get out of our present difficulties, as all great and fundamentally rich countries have invariably done in the past, and I hope we shall manage to do so with the minimum amount of "muddling through." The maintenance of high living standards is a fine and laudable national ambition, but perhaps we shall be on our way faster toward recovery with general realization of the fact that there is still some sound truth in the old saying about the virtues of "plain living and high thinking," and that sound economic laws still govern and control as always, even in this our so-called new era.

* * *

The Boston & Maine's "Flying Yankee" near Melrose, Mass.

Improved Spark Arrester Developed on the Northern Pacific

Designed to eliminate sparks under all load conditions, without the use of netting or increased back pressure

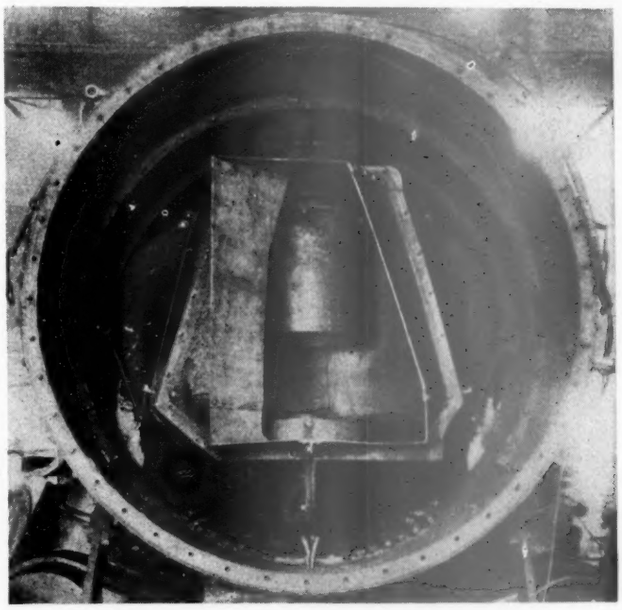
FOR a number of years the Northern Pacific has been using Rosebud coal successfully on locomotives, this light lignite, secured from a large strip mine in eastern Montana, burning freely but being readily drawn to the smokebox and out of the stack. To find some means of burning this coal without attendant fire hazards, the Northern Pacific began experimenting, about two years ago, with a front-end device which depended upon centrifugal action rather than netting to prevent the emission of live sparks from the locomotive stack. This device was developed by M. F. Brown, general fuel supervisor of the Northern Pacific, and called the Cyclone spark arrester. It is now being manufactured by the Locomotive Firebox Company, Chicago, and is applied to about 300 locomotives on the Northern Pacific. A number of other roads are making applications.

Extensive tests on the Northern Pacific, including two conducted by the Forestry Department of the United States Department of Agriculture, indicate that the new spark arrester prevents any sparks leaving the stack of sufficient size to start a fire on the right of way, even in hot summer weather with low relative humidity. This seems to be equally true under any load and firing conditions from minimum to maximum. Besides functioning without front-end netting, a valuable feature of this spark arrester, as shown by the tests, is that it can be used without paying any penalty in decreased efficiency due to higher cylinder back pressure. In fact, with this type of spark arrester, as compared with the standard Master Mechanic's front-end design, a slightly larger exhaust nozzle can generally be used. In addition to promoting the safe burning of light lignite, as well as heavier coals on coal-burning locomotives, the new spark arrester is said to be equally adaptable to use on oil burners to prevent the emission of sparks produced from particles of firebrick and carbon deposits which become detached and overheated.

Record of Burned Holes and Spots on Test Paper Back of Locomotive 1575, Equipped with Master Mechanic's Front End

Test No.	Mile	Train speed M. P. H.	No. 1 112 ft. back of stack Box	No. 2 153 ft. back of stack Box	No. 3 194 ft. back of stack Box	Track grade per cent	
1	119	19	2	0	0	1.35+	to 1.40+
2	103	25.7	28	10	8	0.00	" 0.395+
3	89	25.7	0	2	2	0.286+	" 0.00
4	81	Pulling out of Bearmouth	24	11	0	0.00	" 0.353+
5	75	25.7	3	0	18	0.225+	" 0.337+
6	67	26.7	0	0	6	0.40+	
7	60	27.7	0	4	13	0.37+	" 0.40+
8	50	Pulling out of Garrison	0	0	0	0.4+	" 0.6+
9	36	22.0	0	0	0	0.8+	
10	28		0	0	0	1.35+	" 1.40+
		Total	57	27	47		

The Cyclone spark arrester consists of a large sheet metal drum which surrounds the smoke stack extension and the nozzle tip, and carries at the sides and tops, vertical baffle plates. The intake is also provided with deflectors so arranged that when a locomotive is working the gases and cinders enter the drum in a tangential direction and continue in a circular movement throughout the drum. Centrifugal force carries the cinders to the wall of the drum where they are broken up by friction, ground to the size of coarse sand and extinguished in the gases which fill the drum. Gradually, the cinders work down to the bottom of the drum and, when small enough, are picked up and carried out of the stack in the usual manner.



Cyclone Spark Arrester Installation with One of the Deflector Vanes Removed to Show the Interior Arrangement

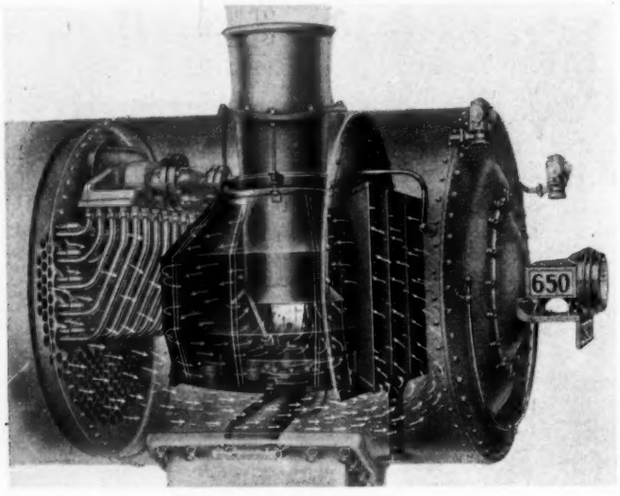
As indicated, wire netting, or perforated plate, is not used in connection with the Cyclone spark arrester, this being a fundamental divergence from general practice, as netting in one form or another is commonly depended upon to prevent the emission of sparks from locomotive stacks. Owing to the absence of netting, there is no possibility of holes developing through which large sparks can pass and cause fires, nor is there any chance of clogged openings, with reduced effective air space and attendant possibility of steam and engine failures. The size of the drum in the new spark arrester corresponds to the cross section of the flue area in such a way that there is no restriction of the draft of the locomotive.

The Cyclone spark arrester consists of a large sheet plate, made in sections, which can be removed to facili-

tate necessary repairs to tubes or superheater units. Ease of inspection is an important feature, there being no necessity to look for small holes either in a netting or around the plates, as in the standard Master Mechanic's front end. The cost of inspection, as well as maintenance, is, therefore, minimized.

U. S. Forest Service Tests Spark Arrester

According to a report issued by John McLaren, regional inspector, Forest Service, United States Department of Agriculture, under date of March 19, 1930, representatives of the U. S. Forest Service, the state forester's office, the University of Montana, and several railway officers were present during a test run in which a 3,465-ton freight train was operated from Missoula, Mont., to Helena, passing over the transcontinental divide en route. The party rode in a caboose coupled directly to the tender of Northern Pacific Locomotive No. 1809, equipped with the Cyclone spark arrester. A second locomotive, No. 1812 of the same type but fitted with a Master Mechanic's front-end arrangement, was coupled six car lengths behind the leading locomotive. These locomotives were both of the Mikado type, stoker fired, carrying a boiler pressure of 200 lb. per sq. in. and burning Rosebud coal. Observations were made on both locomotives at night in order that any sparks emitted from the stacks could be seen more readily. According to the report, two small "floaters" were the only sparks that came from the stack of Locomotive 1809 during this test run, regardless of how hard the locomotive was working and whether or not the grates were being shaken. Locomotive 1812, on the other hand, was reported to have thrown showers of sparks almost continuously when working hard, many of these sparks falling four and five car lengths back of the locomotive.



Phantom View Showing the Construction and Operation of the Cyclone Spark Arrester

On September 5, 1930, another test was made, with the object of obtaining measurable results as to the comparative value of the Cyclone spark arrester and a Master Mechanic's front end equipped with wire netting, the openings of which were 1/10 in. square. A freight train, consisting of 81 cars of 3,691 tons, was made up at Missoula, and hauled by Northern Pacific Locomotive No. 1815, equipped with a Cyclone spark arrester. Ten car lengths back, Locomotive No. 1575, equipped with the Master Mechanic's front end, was coupled in. The coal used on both of these locomotives was of light Rosebud lignite. Test boxes Nos. 1, 2 and 3 were placed on top of the second, third and fourth cars behind Locomotive No. 1575 at distance of 112 ft., 153 ft., and 194 ft., respectively, from the smoke stack. Boxes Nos. 4, 5 and 6 were placed on the second, third and fourth cars back of Locomotive No. 1815 at distances of 96 ft., 137 ft., and 178 ft. from the stack. These test boxes were made of light lumber, 5 ft. long by 11 in. wide by 8 in. high, with baffles placed at uniform distances on the bottoms to keep the cinders from piling up in one end of the box. Inflammable paper towling was secured to the inside of the bottoms of the boxes by thumb tacks and an observer was assigned to each box. At a whistle signal on starting, a canvas cover was removed from each box and kept off for four minutes, each paper then being removed, given a test and box number, rolled up and carefully preserved. New papers were then put in place and the operation repeated on ten individual tests. Records of temperature, humidity and wind velocity were kept, as well as a log of the run, including a record of train speed, etc.

The train left Missoula at 6:25 a.m., and the run to Blossburg, Mont., a distance of 98.8 miles, was completed at 12:16 p.m., several stops being made en route. Side winds, track curvature and the relatively high humidity account for fewer burned spots than might otherwise have been recorded, but a total of 57 burned holes and spots were made on test papers from Box No. 1, 27 from Box No. 2 and 47 from Box No. 3, as shown in the table. All of the tests were uniformly four-minute exposures, except No. 10, when the test covered a period of 20 minutes.

Several holes were burned in the clothing of the men on the cars immediately back of Locomotive No. 1575 and a cinder falling in the grass at Mile Post 110 started a small fire on the right of way. The fact that the test box nearest the locomotive registered the greatest number of burned holes and spots indicates that the heaviest cinders, which would naturally fall first, are also the hottest. The record of Box No. 3 during Test 5 shows, however, that under favorable conditions of track curvature on wind a large number of hot embers may be carried as far as 194 ft. back of the locomotive.

Each of the tests mentioned was made simultaneously with Boxes Nos. 4, 5 and 6 behind Locomotive No. 1815 and no burned holes or charred spots were found on papers carried in these boxes during the entire trip.

Southern Has Difficult Year

(Continued from page 810)

Since that unnaturally stimulated period of activity, traffic and earnings have tended downward, a situation which, it does not seem likely, will persist indefinitely in view of the wealth of the territory served by the railway.

The company, in a sense, marked its centenary on Christmas Day, 1930, since it was on that day one hundred years ago that the "Best Friend of Charleston," the first American-built locomotive in actual service, made its maiden trip on the South Carolina Railroad, which is now included in the Southern Railway System.

THE MISSOURI PACIFIC plans to establish a 20-acre botanical garden near La Feria, Tex., for experimental work.

Accidents in June and July

THE list of train accidents investigated by the Bureau of Safety, Interstate Commerce Commission, and reported on in the months of June and July, 1930, includes 11 cases; five collisions and six derailments. Two of the derailments in this record resulted each in fatal injury to a passenger, and in one wreck there was a big fire. "Careful consideration" of something better than the manual block system is called for by the inspector, as a remedy, in the case of one collision. Government Bulletin No. 44, in which are published the abstracts for April, May and June, contains also a table showing the causes of all accidents investigated in the 12 months ending with June.

Following are abstracts of the eleven reports:

Chicago, St. Paul, Minneapolis & Omaha, Sioux City, Iowa, June 2.—Northbound freight train No. 22, moving slowly, was run into by southbound C. B. & Q. passenger train No. 73,—one locomotive and two cars —moving at about 15 miles an hour; and eight persons were injured. The passenger train had passed the switch at which it should have stopped to meet the freight, the engin man having overlooked a meet order which had been delivered to him only about one mile back. The engineman was familiar with the road and with the contents of the order, and had no explanation except that he was running an engine of a type with which he was unfamiliar. The fireman and a brakeman said that they called the engineman's attention to the meet but apparently he did not hear or understand them; they, however, did not act until very close to the switch. It was customary to meet trains at this track several times monthly. The other members of the crew were familiar with the train order but took no action. The conductor had neglected the rule to read the meeting order to the engineman and had sent it by the brakeman, who rode on the engine for the express purpose of opening the switch at the passing track. The movement of trains here is about 30 each day, and, says the report, the road should "give careful consideration to the need for additional protection" more than the manual block system which is now in use.

Chesapeake & Ohio, Hawk's Nest, W. Va., June 21, 8:55 p. m.—Westbound passenger train No. 47, consisting of a locomotive and eight cars, moving at high speed, was derailed on a curve of 12½ degrees, making a bad wreck, the locomotive being overturned. The engineman and fireman were killed and two passengers and two trainmen injured. The elevation of the outer rail of this curve was only three inches and the speed limit rule was 20 miles an hour. The engineman was a runner of experience, was familiar with the road and had seemed in normal condition. The slow board for the curve was not far enough back, but it is not thought that this location had any bearing on this collision.

Norfolk Southern, Arthur, N. C., June 22, 1:10 a.m.—Northbound passenger train No. 4, moving at 30 or 40 miles an hour, was derailed at a loose switch and the locomotive was overturned. The engineman was fatally injured. The switch appears to have been open about one-half inch and the engineman saw that something was wrong, but evidently not until he was almost at the switch. He applied the brakes only a moment before the engine left the track. The switch lock was out of the hasp and was found hanging by the chain. No evidence could be found of anything wrong in the switch or the rails or the lock, nor whether any employee was responsible for the switch being partly open. The section foreman had made his regular monthly inspection of switches only two days before, and he said that he passes over his section on an average of once a week, either by train or motor car; and the switch was one not often used.

Atlantic Coast Line, Hortense, Ga., July 7, 1:46 p. m. —Southbound passenger train No. 83, moving at about 50 miles an hour, was derailed at a point where the track had just been resurfaced, and the four rear cars were overturned. One passenger was killed and five passengers and six trainmen were injured. The leading part of the train was not derailed and the cause of the trouble is believed to have been distortion of the track by the heat of the sun, the day having been very hot. The section master had raised the track about 2½ inches and had renewed four ties under the rail on which the first marks of derailment appeared; but he declared that he and his men had watched the track as trains passed over it and that it was in good condition. The last preceding two trains had passed about 11 a. m.

Erie, Youngstown, Ohio, July 9.—Collision of a Pittsburgh & Lake Erie westbound passenger train with a preceding Erie freight, on track used jointly by the two companies. The conductor of the freight was killed and one other trainman injured. The flagman of the freight, of 18 years' experience and classed as a conductor, is held responsible for not having flagged the passenger train, the freight being on the time of the passenger and the view partly cut off by the presence of a freight train on an adjoining track. The conductor having been killed, his neglect cannot be explained.

Chicago & Erie, Huntington, Ind., July 11.—A helper engine pushing a caboose to be coupled to a standing freight, was not properly controlled and the caboose crashed against the train and was damaged and the conductor of the freight train killed. The engineman of the helping engine is held responsible. He said that after the collision he found the cut-out cock in the brake cylinder pipe closed, but this was not accepted as a suitable excuse.

Multiplied Mysteries

Pennsylvania, South Elizabeth, N. J., July 19, 9:29 p. m.—Eastbound passenger train No. 228, moving at about 55 miles an hour, was derailed by striking an automobile which had stopped on the track after being run across the station platform. One passenger was killed, 54 passengers, three employees on duty and 12 employees off duty, injured. The locomotive, after running about 1,160 ft. was overturned to the left while two of the cars were derailed to the right and fell off a 12-ft. retaining wall, lodging on their sides in the street. The automobile had approached the railroad from the south side on DeHart Place at an angle of about 75 deg., the driver intending to turn just before reaching the station platform and continue westward along New York Avenue, parallel to the track; but his lights were not burning brightly and in the dark he failed to see the turn in the roadway and continued directly across the platform; and his car dropped 12 in. from the platform to the track. The driver was unable to get the car off the track within the minute or two before the train was upon him. There is a warning sign at this dead-end street, close to the platform, and there was a platform light, also in

line with the street; the warning sign, however, was dim and illegible and neither that nor the platform light were heeded by the driver. The report places the responsibility on Arthur N. Allcroft, driver of the automobile; and says also that the city authorities and the railroad company are at fault for not providing adequate safeguards at the railroad track at the end of DeHart Place. The report says also that had Mr. Allcroft been operating his car with the headlights in operation and had he been fully alert, he should have seen the warnings in time to stop.

The only reference in the report to the mental state of the driver consists of questions as to whether Allcroft, his brother and William McNair, companions in the car, had been drinking. Allcroft said that the other two drank beer at a cafe but that he drank nothing intoxicating. Allcroft was familiar with the locality and knew there was no barrier at the end of the street. The station platform is practically level with the street. McNair "was unable to state whether the driver was awake when the car passed the end of the street." McNair did not see where the car was going as his attention was directed to a dog which was in the rear of the car with him. There was evidence that automobiles had been run off the platform in this way at this place before, the last occasion being on Easter Sunday of this year. An officer of the railroad said that he knew of no reports prior to this accident that a hazardous situation existed at that point. A councilman of the city told of a written report having a year ago called attention to the dangerous conditions at this place. Another city official of 18 years' standing had never heard of any complaints concerning the traffic situation at this place. Since this accident the railroad company has put up a fence at DeHart Place.

Texas & New Orleans, Urbana, Tex., July 20.—An east bound freight train, moving at about 20 miles an hour, was derailed by the breaking of the radius bar of the leading truck of the locomotive and the locomotive was overturned. The fireman was killed and two other employees injured. The first 14 cars were piled up in a heap and were all destroyed by fire which started in a car containing oil. The locomotive, which was of the 2-10-2 type, was built in 1917; received its annual inspection on May 18, 1930, and its last monthly inspection on June 24. The leading truck had a constant resistance type center casting. In the part of the radius bar remaining attached to the engine, seven progressive fractures were discovered. A part of the radius bar and part of the left pedestal brace were not found.

Yadkin, Gold Hill, N. C., July 23, 9:30 p. m.—Trains on this railroad are operated by employees of the Charlotte division of the Southern. A southbound freight train of 39 empty refrigerator cars and a caboose, drawn by two locomotives, was derailed by dirt and stones on the track at a crossing, and the second locomotive was overturned. Several cars were wrecked. The fireman of the leading engine was killed and four other employees were injured. The leading locomotive having been derailed at the crossing, did not leave the roadway nor was the derailment discovered until the train had traveled more than two miles, to a switch. Why the fact that the leading wheels were off the track was not discovered, cannot be explained, as the engineman and a brakeman, who were on the leading engine, were too seriously injured to be interviewed, and the fireman was killed. The track foreman, realizing the danger at this crossing in case of rain had been over the track the night before, on the occasion of a heavy shower, and on the night of the derailment he was again on his way to inspect the crossing and had nearly reached it; but, seeing this train pass over it without any apparent trouble, he returned home and made no further attempt to ascertain the condition of the track at that time. The highway descends toward the track on a grade of about eight per cent. It has but little crown, and surface water follows the ruts made by wheels and drains into the flangeways. The crossing is not planked.

Union Pacific, Menoken, Kan., July 24, 11:41 p. m.—Eastbound freight train extra 2269, consisting of 38 cars and two cabooses, drawn by engines 2269 and 5009, while standing at the station was run into at the rear by a following freight, extra 5026. The two cabooses were wrecked and much other damage done. Two employees, off duty, were killed and one injured; these were in the leading caboose; and three passengers in the rear caboose of the same train were injured. The responsibility is placed on the engineman of 5026, the leading train being 210 ft. inside the yard limit board. He claimed that he was approaching under proper control but the inspector does not accept this view. The fireman and a brakeman, being on the inside of the curve, should have warned the engineman sooner than they did, and it is held that they were not maintaining a proper lookout. They offered the excuse that two headlights on westbound trains had blinded them to some extent, but this excuse seems to be regarded as a flimsy one.

Pere Marquette, McGrew Junction, Mich., July 25, 8:20 p. m.—Locomotive 143 moving slowly in the yard, ran into the side of locomotive No. 1320, and the engineman of 1320 was killed. The report finds that the engineman of 143 misinterpreted a hand signal to set back, the signal being intended for the other engine.

An Executive Views "Umpire" Plan with Favor

IN last week's *Railway Age* (page 761) was published a commentary on F. J. Lisman's plan* for an "umpire" to settle rate questions and reduce competitive wastes which opinion was decidedly unfavorable to the proposal. In the following is presented the view of the chief executive of an important railway who takes the contrary view, i.e., he agrees heartily with Mr. Lisman's suggestion. His letter follows:

Patients Hesitate at Major Operation

"Mr. Lisman's diagnosis of the railway situation in the United States is accurate. His suggested remedy is sound: it may be regarded as a "major operation" and for that reason may prove difficult of acceptance because patients, no matter how serious their condition, are very apt to procrastinate with respect to remedies of such a character. However, this in no way affects the fundamental merits of the proposal.

"Such being the case, I can say, as one who has had a varied experience, that unless the present situation is met by some such scheme as that proposed by Mr. Lisman, there is more than a fair chance that the value of railway securities will be depreciated, even if nothing worse occurs.

"I doubt the wisdom of initiating the plan by territorial trial, for, as Mr. Lisman points out, there is much difficulty in finding a clear line of traffic demarcation. If the plan is worth trying territorially, it has still more

*This plan was outlined in the *Railway Age* of April 4.

merit nationally. With respect to the scheme itself, there is no doubt that it has great potentiality which, in the last analysis, should effect considerable reduction in expenses with no withdrawal of reasonable facilities to the public.

To Avoid Government Ownership

"While a plan for government ownership of railroads is now on the wane, it is conceivable that it might be revived. Should such be the case, the proposed plan is a very effective fighting weapon because it would presumably introduce many of the advantages which are claimed for government ownership with the avoidance of most of the detriments.

"Much will depend upon the cordiality with which the plan is adopted and the loyalty with which it is supported. Without these qualities it will be largely valueless. It is exceedingly difficult to induce large enterprises to act in unison, and the bigger the enterprise the more difficult the problem. Napoleon is said to have expressed thankfulness that he was always fighting a coalition, and the comment was born of a knowledge that the effort of discordant nations was easy to defeat. Measurably that is the situation confronting the railways today because effective harmony of action is frequently absent.

Finding the Man for the Job

"Assuming that the plan is adopted and receives the unwavering support of the railway industry, there then appears immediately what is to my mind the most difficult problem to be solved, namely the selection of an 'umpire' with the personality and capacity to ensure success. While I have no doubt that the plan is sound in principle, at the same time it might be difficult to attract to such an experiment (for so it must be regarded initially) a competent individual who, because he is competent, is presumably more or less permanently and advantageously employed. One need hardly recite in detail the qualifications of an 'umpire' but I might briefly say that he who satisfactorily fills such a post must command the respect and confidence of the railway profession, investors, the public at large, organized labor, and the Interstate Commerce Commission. I mention the latter because the good will and support of that body, if obtained, will be exceedingly useful. Moreover, great tact and leadership, coupled with clarity and allurement of expression, are essential. The 'umpire' must not be reduced to the position of collecting a number of divergent opinions and then selecting an acceptable compromise irrespective of merit. While the display of tact is essential, at the same time the 'umpire' will have to be given enough 'teeth' to impose intelligence rather than comfortable stupidities.

"The transportation companies of the United States, and indeed the North American Continent, are today confronted with a serious situation which is more likely to grow worse than better. The increasing use of highways is a serious competition. In the past, labor policies have not always been intelligent, contacts with the Interstate Commerce Commission and public bodies generally have not been helpful in character, railways are competing deplorably among themselves, research work and efforts to improve the art have not been commensurate with advancements in other lines of industrial activity, and generally there has been lack of cohesion and concentrated effort. If some way could be found to establish these factors, very large economies and much benefit would result.

"A resort to precedent is often the refuge of a mind incapable of sound and effective argument. However, for what it is worth, I believe some supporting precedent exists in the film business, Mr. Hays occupying, with respect to that industry, something like that which Mr. Lisman proposes for transportation. I do not know how effective the activities of Mr. Hays have been, and merely refer to this as having some general bearing on the plan we are discussing.

"Briefly put, what Mr. Lisman proposes is a mobilization of transportation effort and intelligence for offensive and defensive purposes, and the merits of such a proposal to my mind defy successful attack."

Vegetables and Fruits Mar Claim Record

ALTHOUGH freight loss and damage on Class I carriers in the United States showed a decrease of $1,193,326 in 1930, or to $36,239,640, claims paid on fresh fruits, melons and vegetables increased $1,453,448. Among the various commodities, 26 showed decreases totaling $2,876,112, but this was offset in part by the increases in claims on 10 commodities which totaled $1,682,886. Of this latter figure, claims on fresh fruits, melons and vegetables constituted over 87 per cent. Claims on fresh vegetables alone increased $1,343,637, on melons $80,912 and on fresh fruits $28,899. Claims on manufactured tobacco also showed an increase of $118,598. Among the outstanding decreases were claims on new furniture, $569,022, automobiles and accessories, $435,302, livestock $431,867, and miscellaneous articles, $355,924.

Claims paid because of freezing or heater failure increased 46 per cent, those due to robbery of entire package 43.9 per cent, those due to robbery other than entire package 10 per cent, and those due to unlocated damage 7.5 per cent. The outstanding decreases in claim payments, according to causes, were those attributed to fire or marine loss or damage, which were reduced 26.5 per cent, those due to wrecks which were reduced 25.8 per cent, those due to improper handling, loading, etc., which were reduced 17.8 per cent, and those due to defective equipment which were reduced 16.4 per cent.

Claims paid on fresh fruits, melons and vegetables averaged $11.25 per car, on tomatoes $40.04, on carrots $29.83, on cantaloupes $22.72, on cauliflower $22.12, and on lettuce $20.28. The lowest commodity among fresh fruits and vegetables was white potatoes, the claim payments on which averaged $2.30 per car.

A total of 2,327,605 claims were paid during the year, and of these 1,761,240 or 75.7 per cent were paid within 30 days, 361,234 or 15.5 per cent between 30 and 90 days, and 205,131 or 8.8 per cent after 90 days. This compares favorably with 1929 when 2,514,578 claims were paid, 74.7 per cent within 30 days, 16.6 per cent between 30 and 90 days, and 8.7 per cent after 90 days. The amount held in suspense at the close of the year was $2,346,321, which is 15.4 per cent less than the amount held in suspense at the close of 1929. The number of claims unsettled at the close of the year totalled 211,531, the number of claims received from claimants totaled 2,417,110, and the number of claims reopened totaled 99,412, making an aggregate of 2,728,053 claims for the year. Of these 2,289,613 were paid, 260,110 were withdrawn and 178,330 were unsettled at the close of the year, a decrease of 15.7 per cent as compared with those unsettled at the close of 1929.

Motor Transport Section

Illinois Central Substitutes Buses for Trains

Motor coaches of subsidiary enable savings in operating expenses and earn profit on own account

EARLY in 1929, the Illinois Central organized a subsidiary, the Central Transportation Company, as a medium through which it could effect the substitution of motor coaches for passenger trains in instances where there was insufficient traffic to require or justify the operation of a train and not too much traffic to be handled satisfactorily by a motor coach. Only one motor coach was purchased, and this was placed in operation on a 100-mile route paralleling a portion of its main line between Chicago and Omaha. Until early this year this one route represented the entire motor coach operating activity of the Illinois Central. Its record, however, indicates that it has made up in economy, and in effectiveness in adjusting necessary costs to available revenue, what it has lacked in size.

Expenses Reduced

The first motor coach was put in service by the Central Transportation Company on April 27, 1929. Since that time it has continuously operated one round trip daily between Waterloo, Ia., and Dubuque, a distance by rail of 93 miles, and by highway of approximately 100 miles. This motor coach replaced two trains which had been operating between Waterloo and Dubuque. J. F. Porterfield, general superintendent of transportation of the Illinois Central, at an Interstate Commerce Commission hearing in Chicago last January, described the savings in operating expenses which have resulted from this substitution of bus service for train service, as reported in the *Railway Age* of January 10. The two trains taken off accumulated an annual train mileage of 67,890. The "out-of-pocket" cost of operating these trains was 70.21 cents per mile, or $47,665.10 a year. The motor coaches, with a slightly longer route, accumulated 72,270 miles a year, which, on the basis of an operating cost of 19.96 cents per mile, represents an annual cost of $14,425.51. The net saving from the substitution of the motor coach for the trains, therefore, is $33,239.59 a year.

Early this year the Central Transportation Company purchased another motor coach which was put in operation between Waterloo and Ft. Dodge, Iowa, a distance of approximately 100 miles. This motor coach, like the first one purchased, has replaced two passenger trains, and it is estimated that the difference in the cost

The First Illinois Central Motor Coach, a Yellow Type YX

The Second Motor Coach Purchased by the Central Transportation Company, a White Model 54

of operating these two trains and the cost of operating the motor coach will amount to approximately $26,000 a year.

During 1930, the total operating revenues of the Central Transportation Company from the line between Waterloo and Dubuque were $15,416.74. Total operating expenses were $12,468.14, leaving a net revenue from motor coach operations of $2,948.60. Deductions for rent of motor cars and buses totaled $1,062.12, leaving a net income of $1,886.48. The operating ratio was 80.87.

A total of 9,794 revenue passengers were carried an aggregate distance of 461,649 miles. The fare charged for transportation in the motor coaches is based on the railway rate of 3.6 cents per mile and averages 3.34 cents per mile. The average distance per passenger carried was 47.14 miles. Net revenue from operation per bus mile was 4.4 cents.

Traffic Arrangements

The running time of the motor coaches is somewhat greater than that of the trains they have replaced, due to the greater distance by highway and to the fact that the highways over which the motor coaches operate do not touch the railway stations along the line at all points, making it necessary for the bus to leave the direct road occasionally in order to reach each railway station. In addition to the stops at railway stations, passengers are also picked up and discharged at various hotels in Dubuque, Waterloo, and Ft. Dodge, and stops on signal are made at other points.

Bus and railroad tickets are interchangeable, and all tickets of the transportation company are sold by the railway ticket agents, no commission agents being employed. The company is restricted under its operating permit from handling passengers locally between Waterloo and Independence or intermediate points, although it can handle passengers between points within this zone and points outside it. Fifty pounds of hand baggage is handled without extra charge on bus tickets. However, since the bus and railway tickets are honored interchangeably to and from stations situated on both the bus line and the railroad, the passengers with heavier baggage may purchase railway tickets, check their baggage by rail, and then ride either the train or bus.

The bus service is conducted under the supervision of W. S. Williams, general superintendent, Western lines, with headquarters at Waterloo. Railroad forces carry on the motor coach operation in its entirety. The bus operating between Waterloo and Dubuque makes a trip to Waterloo in the morning and returns to Dubuque in the evening, where it ties up for the night. At Dubuque it is housed and maintained in buildings provided for the maintenance of railway equipment, all necessary work being done by railroad shop employees. The bus between Ft. Dodge and Waterloo leaves Ft. Dodge in the afternoon and arrives at Waterloo in the evening, returning to Ft. Dodge after a five minute layover. At the present time garage facilities at Ft. Dodge are rented, but within a short time this bus too will be housed and maintained like the one operating from Dubuque, a stall in the roundhouse being provided for it. Bus drivers have been drawn from the mechanical department forces of the railroad. In each shop are several mechanics who have been trained in the operation of the buses and who are available when needed as extra drivers.

The first motor coach purchased by the Central Transportation Company was a Type YX Yellow coach, manufactured by the General Motors Truck Company. This has a capacity of 24 passengers, with space at the rear for baggage. The motor coach purchased this year for operation between Ft. Dodge and Waterloo is a Model 54 White, which has seats for 24 passengers and a walled-in compartment for baggage, newspapers and mail.

The Waterloo-Dubuque bus covered 67,326 miles in 1930. The operating cost of 18.5 cents per bus mile indicates the efficiency with which the coach was operated and maintained. Total maintenance expenses were $3,750.02, or 5.5 cents per mile, including a charge of $1,864.68 for depreciation. The total transportation expenses were $8,893.55, including $168 for licenses and $1,511.11 for the Iowa ton-mile tax.

Co-ordinated Service on the Cotton Belt, Furnished by (left to right) Light Pick-up Trucks, Merchandise Car and Heavy Intercity Truck

Cotton Belt Benefits from Bus and Truck Service

Savings in rail operating expenses exceed losses encountered by highway subsidiary—Lost traffic recovered and competition reduced

THE St. Louis Southwestern has probably gone farther than any other railway in carrying out to the fullest possible extent the co-ordination of railway and highway transportation. It has vigorously initiated and prosecuted a comprehensive program of motor coach and motor truck operation designed to combine railway and highway transportation in such a manner as to effect the recovery of traffic lost to highway competitors, and to increase efficiency and reduce operating expenses by the replacement of unprofitable train service.

The Cotton Belt incorporated a subsidiary, the Southwestern Transportation Company, in 1928. The transportation company now has 1,318 miles of certificated motor truck routes, and 2,150 miles of certificated motor coach routes. Motor coaches and trucks operate over routes paralleling the greater part of the Cotton Belt railway mileage. Motor trucks are operated not only in intercity service, but are used also to provide pick-up and delivery service, in connection with the intercity truck service, at all important stations on the Cotton Belt, except St. Louis, part of the pick-up and delivery service is provided directly by the transportation company, and part by independent draymen operating under contracts with the transportation company. Another important aspect of the transportation company's service is the movement of transportation company traffic in freight cars on the railway, the transportation company providing pick-up and delivery service by motor truck and paying the railway for the line haul on a car-mile basis. These so-called "trap cars" are merchandise cars operated regularly by the railway before the transportation company's service was begun, and contain the railway's as well as the transportation company's freight.

Current operations involve the use of 52 motor coaches, 22 trucks for pick-up and delivery service, and 35 trucks, 14 semi-trailers, and 15 four-wheel trailers for line-haul service.

Two Objects

The transportation company has two fundamental objects: One is to improve, at substantially less expense, the local passenger service of the Cotton Belt; the other is to regain the l.c.l. merchandise traffic of the railway by a modernized service. With the first object in view, motor coach lines now extend from St. Louis, Mo., to Jonesboro, Ark., and via Cairo, Ill., to Memphis, Tenn.; from Memphis to Pine Bluff, Ark., Little Rock and Gillette; from Pine Bluff to Texarkana; from Texarkana to Mt. Pleasant, Tex.; from Mt. Pleasant to Shreveport, La., Tyler, Tex., Lufkin and Waco; and from Mt. Pleasant, via Dallas and Fort Worth, to El Paso, Tex., and Las Cruces, N. M. That

Fifty-two Motor Coaches Are Operated

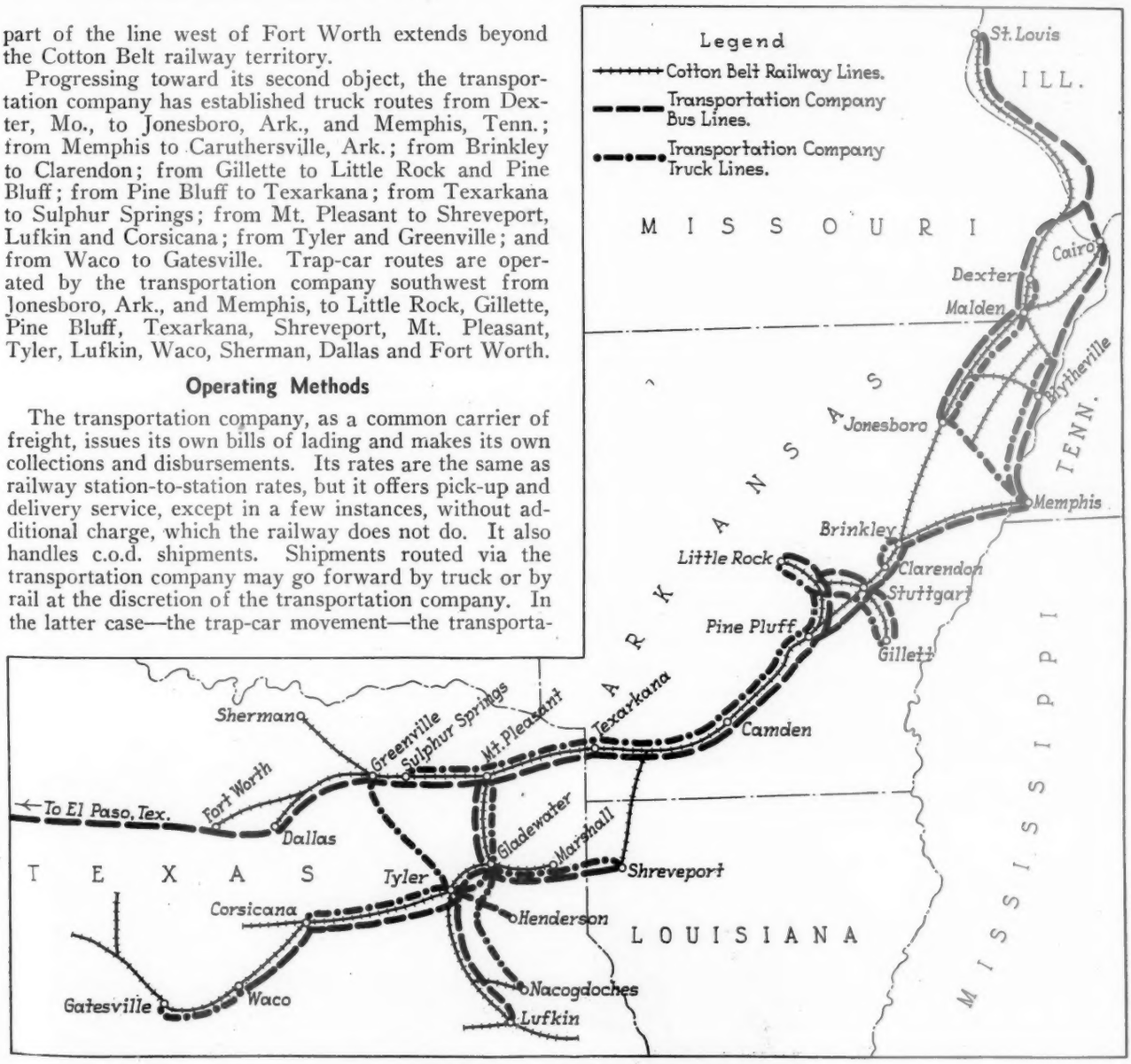
part of the line west of Fort Worth extends beyond the Cotton Belt railway territory.

Progressing toward its second object, the transportation company has established truck routes from Dexter, Mo., to Jonesboro, Ark., and Memphis, Tenn.; from Memphis to Caruthersville, Ark.; from Brinkley to Clarendon; from Gillette to Little Rock and Pine Bluff; from Pine Bluff to Texarkana; from Texarkana to Sulphur Springs; from Mt. Pleasant to Shreveport, Lufkin and Corsicana; from Tyler and Greenville; and from Waco to Gatesville. Trap-car routes are operated by the transportation company southwest from Jonesboro, Ark., and Memphis, to Little Rock, Gillette, Pine Bluff, Texarkana, Shreveport, Mt. Pleasant, Tyler, Lufkin, Waco, Sherman, Dallas and Fort Worth.

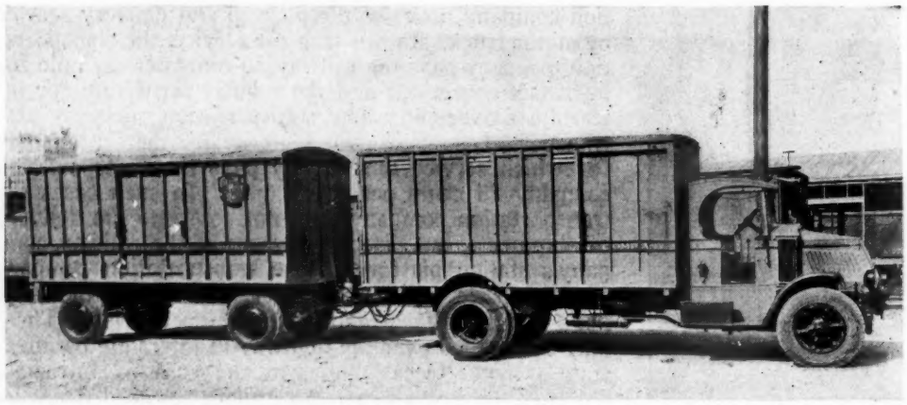
Operating Methods

The transportation company, as a common carrier of freight, issues its own bills of lading and makes its own collections and disbursements. Its rates are the same as railway station-to-station rates, but it offers pick-up and delivery service, except in a few instances, without additional charge, which the railway does not do. It also handles c.o.d. shipments. Shipments routed via the transportation company may go forward by truck or by rail at the discretion of the transportation company. In the latter case—the trap-car movement—the transportation company provides the pick-up and delivery service by motor truck. In this trap-car service, the transportation company pays the railway 50 cents per car mile for intrastate movement and the regular tariff rate for interstate movement. The transportation company also transports freight over the highway for the Cotton Belt, for which service the railway pays the transportation company 25 cents per truck mile. In such cases the transportation company does not complete the delivery of shipments, but discharges them at the railway company's station platform. The transportation company also publishes tariffs for trailer loads under the shipper's count and seal and at the shipper's risk. These may be handled over the highway in interstate or intrastate traffic. Occasionally, in the case of intrastate movements of this kind, the trailers are loaded on flat cars for movement over the railway.

The expansion of the transportation company's operations and their effect on the Cotton Belt's operations were reflected in the showing made in 1930. The transportation company's freight revenues in 1930 were $428,934, compared to $225,757 in 1929. Passenger



The Co-ordinated Railway and Highway System of the Cotton Belt



Heavy Trucks and Trailers Are Used on Intercity Lines

revenues increased from $407,099 in 1929, to $432,774 in 1930. Total revenues increased from $694,033 to $906,986. Operating expenses in 1930 were $1,376,370, compared to $986,958 in 1929. The expenses in 1930 included an amount of $325,437, representing in large part the cost to the transportation company of the "trap cars" furnished by the railway.

Railway Benefits

This would indicate that expenses of the transportation company exceeded revenues in 1930 by approximately $470,000. Offsetting this loss, however, were the savings made possible to the railway by the transportation company's operations. In 1930, the railway company saved $543,896 from passenger trains discontinued, $29,835 from the transfer of express to the transportation company, $18,978 from the elimination of merchandise cars, and $45,624 from freight train mileage discontinued for which truck service was substituted. It also benefitted to the extent of $325,442 in revenues from the trap car movement at 50 cents per car mile and at tariff rates, and received $6,960 in additional rental at the Dallas terminal and $4,180 for railway tickets purchased. The total savings or revenues of the railway, attributable to the transportation company in 1930, were $974,915.

This is offset to the extent of $302,703 by certain losses or charges suffered by the railway, including $139,520 in passenger revenues, $26,297 in mail revenue, $129,322 in payments to the transportation company for handling express, and $7,565 for expenses in the handling of trap cars. Adding to the revenues of the transportation company the aggregate of savings by the railway gives a total of $1,881,902 in total revenues and savings. Adding the operating expenses of the transportation company to the losses of the railway gives a total of $1,679,073 in total expenses and losses. The total revenues and savings, therefore, exceeded the total expenses and losses by $202,829. This figure for 1930 compares with a deficit, on the same basis, of $129,375 in 1929.

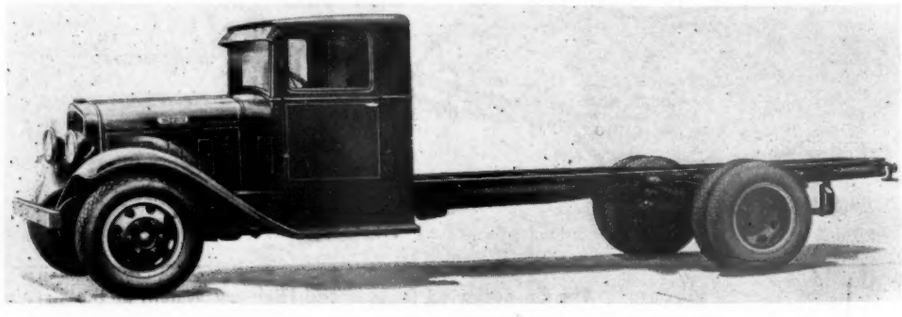
One of the objects of the co-ordinated service is to regain traffic for the railway and its subsidiary. That this object is being accomplished is indicated by the fact that at one of the largest stations on its line, where the Cotton Belt and the transportation company, as well as two other railways, all use the same outbound freight house, the last two roads handled substantially less merchandise traffic in 1930 than in 1929, while the Cotton Belt and the transportation company, considered together, handled substantially more traffic in 1930 than in any year in the history of the railway company. The passenger revenues in 1930 of the transportation company and the railway together, furthermore exceeded the passenger revenues of the railway in 1929.

Another effect of the transportation company's operations has been virtually to eliminate independent motor coach and motor truck competition with the railway. There still remains the competition of contract and private trucks.

New Line of Trucks Offered by Sterling

A NEW line of motor trucks, comprising 29 models with capacities ranging from ¾ ton to 12 tons, has been placed on the market by the Sterling Motor Truck Company, Milwaukee, Wis. The bevel-drive trucks come in six models with capacities from ¾ to 4 tons. The wheel-base lengths vary from 142 in. to 204 in., and all are powered with six-cylinder engines. The equipment includes Timken axles at both front and rear, Budd steel wheels, and hydraulic four wheel brakes, the larger models having boosters to increase their braking efficiency.

There are five double-reduction-drive speed trucks with carrying capacities of from 3½ tons to 10½ tons,



Sterling 3½-4 Ton Model FD-80 Truck

and with wheel-bases of from 126 in. to 222 in. These models are powered with the Ricardo Red Head engine, and the larger units are equipped with air brakes. The four largest of these models are also supplied as tractors.

The other trucks in the new line include four worm-drive models ranging in capacity from 4 tons to 10½ tons; seven models with chain drives and with capacities of from 5 to 10 tons and three models with dual chain drives. There are also four models with dual worm drives with capacities from 3½ to 12 tons.

White Introduces New Four-Cylinder Trucks

THE White Company, Cleveland, Ohio, is producing six new four-cylinder trucks which are designed to meet modern traffic conditions in the quick-delivery field. The chassis specifications for the new models are similar, with the exception of the tire and axle equipment. Models 160 and 161 have single tires on the rear and wheels 162, 210, 211 and 212, of greater carrying capacity, have dual tires on the rear.

The four-cylinder, GRC-B engine used in all models, has a bore of 4 in. and a stroke of 5¾ in., giving a piston displacement of 289 cu. in. The engine is of monoblock construction with aluminum pistons and machined combustion chambers. The valve stems and springs are completely enclosed, but are accessible for adjustment or repair through detachable cover plates. A gear-driven pump supplies oil, under pressure to the main, camshaft, connecting rod and piston pin bearings. The pistons and cylinders are lubricated by a constant spray of oil, the volume of which is controlled by metered passages.

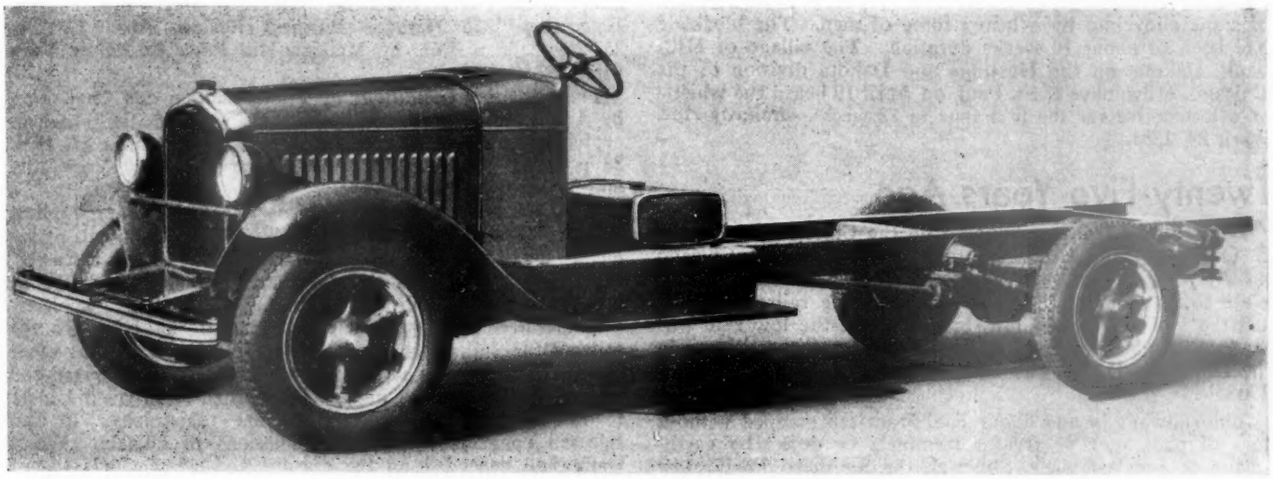
The inlet manifold is constructed integral with the exhaust manifold, providing a hot spot for better vaporization of the fuel. The compound-jet, double-venturi-type carburetor has an air cleaner as standard equipment. Positive water circulation, through the large cylinder jackets, is obtained by a gear-driven centrifugal pump. The chromium plated radiator casing is mounted on springs to prevent damage to the cellular core. A vacuum feed system supplies gasoline to the engine from the 20-gal. tank mounted under the seat.

The single-plate clutch operates in oil. All rotating parts of the clutch are carefully balanced with the flywheel assembly, and automatic lubrication of the clutch throwout and the throwout shaft bearings is provided.

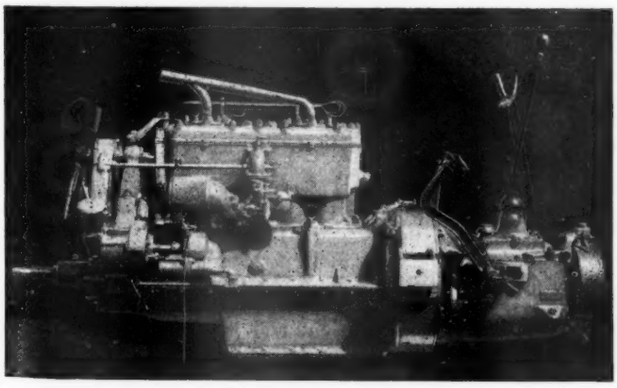
The four-speed transmission has wide-faced gears and large diameter shafts supported by heavy ball bearings. A rear axle ratio of 4.73 to 1 is standard, with optional ratios available of 4.23 to 1, 5.22 to 1 and 5.88 to 1. The pressed-steel, heat-treated, channel-section frame has large channel-section cross members with a tubular cross member located at the front. The steering gear has ball thrust bearings and is adjustable for wear.

The Lockheed hydraulic, internal-expanding service brakes operate within gun-iron brake drums on all four wheels. A powerful emergency brake of the external contracting type is located at the rear of the transmission.

The spring shackles can be adjusted for side wear, and the front springs have rebound plates. Cast steel wheels are standard equipment.



White Model 160, Four-Cylinder Truck



The Four-Cylinder GRC-B Engine Used in the New Trucks

GEORGE F. BAUER, export manager of the National Automobile Chamber of Commerce, left New York on April 21 for a six-months' lecture tour of the Far East, during which he will meet with local leaders to exchange experiences on highway transport development. Accompanying Mr. Bauer is equipment which will enable him to present illustrated lectures on automobile operation, road construction and financing, traffic control and other subjects, in the language and dialects of the various countries which he will visit.

Looking Backward . . . New Books . . .

One Hundred Years Ago

The South Carolina [now part of the Southern] on April 5, 1831, operated the first locomotive with a four-wheel bogie truck. The locomotive hauled four cars with 117 passengers, 2.75 miles in 11 minutes.

The State of Pennsylvania granted a charter to the Cumberland Valley Railroad [now part of the Pennsylvania] on April 2, 1831, following a survey, which was authorized at a meeting of the Board of Canal Commissioners at Harrisburg on March 26, 1820, to ascertain the practicability of the construction of a railroad from Harrisburg to Chambersburg, Gettysburg and York.

Fifty Years Ago

On July 29 the Chicago, St. Louis & New Orleans [now part of the Illinois Central] will change the gage of its entire line from 5 ft. to the northern standard of 4 ft. 8½ in. Only one rail will be moved, and this will probably be done in a single day, involving 550 miles of line between New Orleans, La., and East Cairo, Ky.—*Railway Age,* April 28, 1881.

The Sioux City line of the Chicago, St. Paul, Minneapolis & Omaha, which had been practically closed by snow since February 1, was opened again April 16, after a hard period of snow shoveling by a heavy force of men. The blockade had been of about 10 weeks duration. The village of Millbank, Dakota, on the Hastings and Dakota division of the Chicago, Milwaukee & St. Paul, on April 19 heard the whistle of a locomotive for the first time in 12 weeks.—*Railway Age,* April 28, 1881.

Twenty-Five Years Ago

A fine of $60,000 was imposed on the Chicago, Burlington & Quincy by the United States District Court at Chicago on April 20 for an unauthorized reduction of rates on tin plate to Vancouver, B. C. Counsel for the railroad admitted the violation of the law, but said that the low rate was made to enable an American manufacturer to participate in the export trade via Vancouver.—*Railroad Gazette,* April 27, 1906.

The railways in and about San Francisco escaped without loss of passenger or freight terminals or docks by earthquake or fire last week, although the Southern Pacific lost a freight shed and 40 or more freight cars on a track which served various industries from the Vallejo street pier, at the north end of the burned district. The great ferry house at the foot of Market, with its spacious slips, escaped the flames and is in full service. Twenty-four railway companies had offices on Market and Montgomery streets and all were burned out, with the loss of their papers and records.—*Railway Age,* April 27, 1906.

Ten Years Ago

The Interstate Commerce Commission on April 18 authorized the Delaware, Lackawanna & Western to issue $45,000,000 of additional common stock to be distributed as a dividend. The commission declared that the present capitalization is below the actual investment or fair value of the property.—*Railway Age,* April 22, 1921.

The long controversy over the railway employees' demand for the perpetuation of their national agreements was ended on April 14 by a decision handed down by the Railroad Labor Board which sustained some contentions of both the carriers and the employees. The award abrogated national agreements, remanded the negotiation of new agreements to the individual carriers and upheld the railroads' interpretation of the principle of collective bargaining. Both sides expressed satisfaction with the terms of the decision.—*Railway Age,* April 22, 1921.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

America Moves West, by Robert E. Riegel. A readable survey of the expansion from the Atlantic to the Pacific. Physical, governmental, exploration, road, steamboat, fur, Indian, psychological, and railroad problems are outlined. Chapter 28 "The Coming of the Railroad," 29 "From Preemption to Homestead," 32 "Railroads West of the Mississippi," 33 "The Building of the Union Pacific," 38 "The Transcontinental Railroads" and 39 "Western Panaceas" may be of especial interest. Chapter 42 "Where Has the Frontier Gone?" raises a modern problem the answer to which is still to be found. 595 p. Pub. by Henry Holt & Co., New York City. $3.75.

Business Adrift, by Wallace Brett Donham. With an introduction "On Foresight" by Alfred North Whitehead. The author of the introduction is Professor of Philosophy at Harvard. The author of the book is Dean, Graduate School of Business Administration, Harvard. The rapidity of change today and its implications for business are discussed. Extract under title "Can American Business Meet the Present Emergency?" in Harvard Business Review, April 1931, p. 257-269. 165 p. Pub. by McGraw-Hill Book Co., New York City. $2.50.

The Changing Conditions of Transportation and Commerce, by Lewis K. Sillcox. Why the change and the problems evolving therefrom. Lecture at Penn State, March 27, 1931. 28 p. Pub. by New York Air Brake Co., New York City and Watertown, N. Y. *Apply.*

Economic History of the American People, by Ernest Ludlow Bogart. Colonial development, 1492-1783; Westward movement, 1783-1860, and Industrialization, 1860-1930 discussed. "While in 1830 it was thought that canals would always be preferred to railroads, by 1860 the latter had completely demonstrated their superiority..... Had it not been for the railway the full development of the Far West, and of other parts of the country untouched and inaccessible by river and canal, would have been impossible. But the railroad did more than emancipate transportation from topography; it also released commerce from the limitations of climate. Water traffic had depended on the seasons and winter had stopped canal and river traffic in the North as completely as it did agriculture. When commerce ceased, industry slackened, labor was thrown out of employment, and capital lay idle. The greatest benefit conferred by the railroad was probably continuity of service, though directness and speed were also important; compared with water routes, transportation by rail was more expensive, but this disadvantage was more than offset by the other three advantages....." p. 343-344. 797 p. Pub. by Longmans' Green & Co., New York City. $3.50.

The Wharton School; Its Field in a Changing World, by Danial Willard. Address at 50th Anniversary of Wharton School of Commerce and Finance. 9 p. Pub. by Baltimore & Ohio Railroad Co., Baltimore, Md. *Apply.*

Periodical Articles

Russia of Today, by Ralph Budd. Survey of railroad and economic conditions. Pacific Coast Review, April, 1931, p. 42, 48-49.

San Francisco to Salt Lake City, Through the Feather River Canyon, by Thomas P. Brown. Illustrated description of the country of the Western Pacific with some history of the railroad. Pacific Coast Review, March, 1931, p. 14-15, 23-24, 26, 29, 40, 54; April, 1931, p. 31, 33, 63.

Six-Hour Day, by John Austin. "The effect that the six-hour day will have on freight and passenger rates is quite another story—a bridge to be crossed when it is reached." p. 8. Railroad Man's Magazine, April, 1931, p. 2-8.

Odds and Ends . . .

A New Use for Railway Scrap

Embargoes on arms have only slight effect in hindering native uprisings in Afghanistan. The guns used by Afghan tribesmen in border wars are made, the British have discovered, on rather primitive machinery built entirely from discarded railway material.

Oldest Crew Caller?

The Louisville & Nashville claims for L. A. Tilden, who calls crews at Lebanon Junction, Ky., the record as being the oldest crew caller in the service of American railways. Mr. Tilden is 71 years old and states that he intends to retire from active employment at the age of 150.

Conductors' Troubles

"Lady, you'll have to pay half-fare for that boy."
"But, conductor, he's only four years old."
"Well, he looks like a six-year old."
"Sir, I have been married only four years."
"Lady, I'm not asking for a confession; I'm asking for a half-fare ticket."—Santa Fe Magazine.

Abbott's Mexican Experience

The experience of hearing his own death argued among Mexican bandits is reported by B. T. Abbott, Illinois Central System colonization agent at Jackson, Miss., in an interview appearing in the Illinois Central magazine. Mr. Abbott's capture occurred when he was in the employ of the National Railways of Mexico as an agricultural advisor. The argument ended in an agreement upon a ransom of $150 (reduced from $5,000), which was finally paid. Mr. Abbott also reports an interview with the late Pancho Villa.

Air-Minded Ticket Clerks

Something about the atmosphere of the Ferry building at San Francisco seems to promote air mindedness, and particularly among the ticket clerks. C. P. Decrevel, a ticket clerk for the Southern Pacific there, has 450 hours of flying experience and a flying commission as a second lieutenant in the Arkansas National Guard to his credit. When the new Martinez-Benicia bridge across Suisun bay was dedicated last November, Mr. Decrevel took Ralph Anderson, also a ticket clerk at the Ferry building, aloft to practice his hobby of air photography on the mile-long structure.

A Curious Commuter

Several residents of Attleboro, Mass., are convinced that the New Haven carries almost daily a passenger between Attleboro and Providence, R. I., without collecting a fare. This commuter is a pigeon that makes its home in the vicinity of the Attleboro passenger station, and every day hops the 1:30 p. m. train to Providence, finding a resting place on the last car, hiding behind a bulge in the roof which serves as a perfect windbreak. One Attleboroan found that the pigeon made the return trip to Attleboro on a later train, which arrives there at 2:20 p. m. Only on rainy days does the commuter forego its ride.

An Internationally Governed Town

Many railroad towns, as has often been demonstrated in this department, have mayors and city fathers who are railroad employees. Now comes a metropolitan suburb which has placed a railroad president at the head of its civic affairs. Scarsdale, N. Y., is the community which has just shown its civic wisdom by electing as Mayor Fred Lavis, railway engineering authority, and president of the International Railways of Central America. Another railroad officer, Jacob Aronson, general counsel of the New York Central, at the same election was chosen a member of the village board. Other members elected to the board include a prominent water service engineer who served with the Railroad Transportation Corps in France, and a professor of English at Columbia University.

Britain's Fastest Engine Retired

Great Britain's fastest and most famous engine, the Great Western locomotive, "City of Truro," has been retired from active service. It was not scrapped, but has been preserved and sent to the York Railway Museum.

The "City of Truro" made British and World railway history in 1904 by achieving the highest authenticated speed ever recorded—102.3 m.p.h.—on the run up from Plymouth when competing for the American mail. The engine was, therefore, the first form of locomotion to pass the 100-m.p.h. mark, and even today still holds the official speed record for a railway locomotive. During its 27 years of service, the City of Truro has run 1,000,438 miles and has lately been employed on the Chester to Oxford, Oxford to London, Shrewsbury to Bristol services.

The record run was the culmination of the great fight between three railway companies for the American mail traffic via Holyhead and Liverpool on the one hand, and Plymouth on the other. The effect of the run and the securing of the ocean mail traffic by the Great Western virtually placed Plymouth on the direct London-New York route, and established it once and for all as the nearest and quickest port of call between the two cities.

The "City" class of engines are of the 4-4-0 type. They were constructed in 1903 and 1904 and at that time were the principal passenger engines on the Great Western system, being used on all the main express services, on the special trains run to Plymouth on July 14, 1903, for His Majesty the King and on the first Cornish Riviera Express on July 1, 1904, which resulted from this Royal special.

The Broken Switch Point

When Omer S. Lewis, now general freight traffic manager of the Baltimore & Ohio, was division freight agent on the old C. H. & D., about 20 years ago, the Findlay & Ft. Wayne Railroad, then part of the C. H. & D., was suffering from one of the then periodic car shortages. The farmers' elevators along the line were overflowing with grain, and hay was piled along the right-of-way, waiting for cars.

Mr. Lewis had advice of a train of empties that was being sent west to relieve the situation, and decided to make a personal inspection of the division and distribute the cars in a manner best calculated to meet the needs of the shippers. So he arranged with the superintendent that they make a trip together over the road on a motor car, and they were accompanied by the division engineer who had been recently appointed and had not heretofore been over the line. They got a pretty severe jolt in crossing a switch, and the engineer had the car stopped and found that the switch point was broken. He asked the section foreman, who was operating the car, if he knew about the condition. The foreman was an old-timer, and responded without much enthusiasm that he did.

"Have you reported it?" asked the engineer.

"Oh, yes," replied the foreman, still showing no signs of excitement.

"How long ago did you first report it?" persisted the engineer.

"Wall," drawled the foreman, scratching his head reminiscently, "as near as I can remember it was just 22 years ago last May."

The response of the engineer has been lost to posterity, and so has the road, for during the war its tracks were sold to a scrap iron dealer, torn up, and, according to report, sent to France for use on the military railroads there.

Operating Statistics of Large Steam Railways—Selected Items for the Month of February, 1931,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross. Excluding locomotives and tenders	Ton-miles (thousands): Net. Revenue and non-revenue	Average number of locomotives on line: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1931	407	148,514	154,268	11,609	3,737	64.4	202,449	73,267	92	37	28.5	29
	1930	407	182,888	194,620	19,975	4,342	64.6	236,760	87,770	102	24	19.3	33
Boston & Maine	1931	2,066	308,591	353,638	34,227	9,882	67.6	539,298	202,633	256	50	16.4	66
	1930	2,066	347,721	403,058	55,113	11,381	68.1	614,790	235,885	261	53	16.8	68
N. Y., New H. & Hart.	1931	2,094	360,399	420,488	23,001	11,930	63.4	674,585	256,961	270	79	22.5	33
	1930	2,106	405,563	471,986	28,791	13,466	61.8	762,012	288,271	287	57	16.5	50
Great Lakes Region:												
Delaware & Hudson	1931	876	262,422	344,435	33,034	7,908	60.2	509,629	234,695	242	28	10.2	111
	1930	875	312,244	414,955	44,676	9,556	62.6	603,215	286,076	235	32	12.0	82
Del., Lack. & Western	1931	998	383,704	424,463	51,436	12,205	65.5	712,522	293,009	217	60	21.8	28
	1930	998	436,581	482,445	55,977	14,494	66.7	833,047	347,619	240	52	17.7	34
Erie (inc. Chi. & Erie)	1931	2,316	679,201	713,168	61,354	28,893	60.9	1,776,747	689,026	385	94	19.6	109
	1930	2,316	806,180	865,711	63,811	34,022	61.8	2,073,837	834,333	406	92	18.5	78
Grand Trunk Western	1931	1,019	212,904	216,084	3,550	5,999	61.6	351,442	123,389	75	39	34.1	40
	1930	1,020	276,209	279,539	4,268	8,032	65.1	446,078	165,493	91	28	23.8	30
Lehigh Valley	1931	1,343	421,087	450,429	45,363	12,604	61.4	789,486	325,932	228	113	33.2	17
	1930	1,343	483,935	530,451	60,162	14,620	63.5	888,725	379,136	253	85	25.2	12
Michigan Central	1931	1,869	379,256	381,387	9,482	12,399	60.9	716,046	244,586	155	61	28.1	45
	1930	1,865	475,139	476,058	14,935	16,072	59.9	935,008	321,985	189	41	17.6	36
New York Central	1931	6,477	1,569,785	1,713,086	122,572	57,617	59.7	3,623,191	1,469,254	888	467	34.5	287
	1930	6,468	1,869,380	2,078,127	153,538	68,654	59.4	4,323,272	1,819,228	1,015	321	24.0	239
New York, Chi. & St. L.	1931	1,660	461,695	470,139	5,808	14,862	59.0	887,080	310,244	177	66	27.1	48
	1930	1,665	597,715	609,196	5,153	18,184	61.0	1,070,265	403,557	204	55	21.2	29
Pere Marquette	1931	2,201	302,410	311,253	2,665	7,323	59.8	455,474	173,838	161	25	13.5	55
	1930	2,177	404,258	408,118	3,130	9,851	61.4	607,245	249,940	172	27	13.7	24
Pitts. & Lake Erie	1931	235	78,256	80,234	598	2,865	61.5	230,142	123,201	53	21	27.9	26
	1930	232	110,601	114,461	1,322	3,805	58.0	302,035	165,328	50	14	21.5	13
Wabash	1931	2,497	618,900	650,299	11,519	18,202	61.1	1,078,383	366,340	288	119	29.3	54
	1930	2,497	748,188	792,476	13,157	21,844	61.6	1,294,525	468,076	292	76	20.6	24
Central Eastern Region:												
Baltimore & Ohio	1931	5,536	1,285,048	1,506,926	178,324	39,819	59.6	2,695,396	1,179,244	931	240	20.5	231
	1930	5,541	1,618,527	1,871,037	239,346	48,643	60.2	3,288,170	1,492,012	987	219	18.2	152
Big Four Lines	1931	2,723	558,827	581,863	17,261	17,136	60.1	1,107,266	488,513	295	128	30.3	66
	1930	2,712	758,959	785,267	21,765	22,365	58.9	1,500,438	683,653	316	140	30.7	10
Central of New Jersey	1931	692	182,280	198,656	30,055	5,344	55.0	381,193	174,393	150	39	20.8	43
	1930	693	238,617	258,835	39,070	6,763	56.3	475,349	218,122	168	33	16.6	14
Chicago & Eastern Ill.	1931	939	168,746	169,083	2,403	4,212	61.2	268,223	112,190	90	65	41.8	34
	1930	946	220,549	222,077	2,802	5,662	62.8	359,360	159,859	96	64	39.9	23
Elgin, Joliet & Eastern	1931	447	102,730	106,440	4,782	2,598	59.2	204,856	100,688	80	13	14.4	16
	1930	453	126,199	134,266	7,159	3,425	59.8	265,528	135,066	79	15	15.9	...
Long Island	1931	400	37,030	39,929	10,065	438	52.7	32,580	12,671	41	11	21.8	...
	1930	400	42,662	46,778	12,773	470	52.7	33,828	13,080	48	8	14.8	...
Pennsylvania System	1931	10,668	2,977,648	3,345,346	347,171	100,650	60.6	6,772,098	2,969,763	2,262	313	12.2	804
	1930	10,690	3,447,212	3,961,455	390,334	118,569	61.8	7,951,124	3,600,418	2,378	366	13.3	577
Reading	1931	1,446	509,343	549,834	49,446	13,486	56.8	1,004,086	478,289	322	66	17.1	57
	1930	1,452	600.395	649,145	50,806	15,531	57.7	1,133,608	553,916	335	64	16.0	35
Pocahontas Region:												
Chesapeake & Ohio	1931	3,116	899,599	950,411	35,561	31,417	53.9	2,646,804	1,385,050	617	72	10.4	233
	1930	3,086	1,146,791	1,216,687	51,012	38,740	53.7	3,237,994	1,724,370	566	99	14.9	64
Norfolk & Western	1931	2,226	598,915	653,070	34,591	21,155	58.5	1,741,777	891,109	446	46	9.4	158
	1930	2,230	794,102	907,092	56,517	28,696	56.7	2,472,850	1,306,382	445	48	9.7	75
Southern Region:												
Atlantic Coast Line	1931	5,162	681,485	688,306	10,084	15,902	56.6	910,133	296,110	390	85	17.9	78
	1930	5,155	632,233	633,328	9,291	16,696	59.3	936,963	323,129	400	57	12.6	90
Central of Georgia	1931	1,900	206,145	207,312	3,740	4,849	67.9	265,167	103,957	113	36	24.5	1
	1930	1,900	235,222	236,807	4,309	6,017	71.5	317,954	131,096	123	30	19.3	5
Ill. Cent. (inc. Y. & M. V.)	1931	6,670	1,371,000	1,387,018	23,564	34,388	60.5	2,274,455	907,300	708	174	19.7	60
	1930	6,694	1,708,447	1,724,211	29,521	45,029	60.4	3,010,731	1,253,786	715	116	14.0	14
Louisville & Nashville	1931	5,268	1,090,835	1,145,172	30,124	22,364	57.7	1,551,087	704,251	524	178	25.3	133
	1930	5,247	1,441,103	1,532,245	45,570	30,424	56.8	2,147,757	999,468	553	143	20.5	26
Seaboard Air Line	1931	4,466	512,057	521,714	5,200	12,632	59.4	761,423	260,910	272	31	10.2	15
	1930	4,491	541,416	554,386	6,144	13,846	63.3	801,483	298,379	270	26	8.8	3
Southern	1931	6,675	1,125,139	1,140,067	21,746	26,462	64.8	1,475,163	571,569	786	190	19.4	216
	1930	6,676	1,328,191	1,356,112	26,453	31,731	62.4	1,842,151	718,962	791	164	17.2	141
Northwestern Region:												
Chi. & North Western	1931	8,459	1,010,646	1,066,270	28,427	26,234	61.9	1,556,609	590,257	723	145	16.7	199
	1930	8,459	1,247,953	1,306,430	25,081	31,938	61.9	1,885,164	767,879	744	99	11.8	59
Chi. Gt. Western	1931	1,459	213,717	213,721	10,944	7,125	58.4	434,610	155,108	114	16	12.1	11
	1930	1,459	276,744	314,287	16,905	7,711	61.8	447,955	168,162	109	17	13.7	9
Chi., Milw., St. P. & Pac.	1931	11,300	1,194,716	1,260,082	58,643	32,102	60.9	1,991,546	790,730	785	150	16.0	326
	1930	11,244	1,446,208	1,542,986	79,835	39,375	60.7	2,435,401	983,193	820	135	14.2	240
Chi., St. P., Minn. & Om.	1931	1,714	219,929	240,056	10,101	4,725	64.7	270,960	109,386	156	26	14.2	60
	1930	1,724	290,694	314,585	14,059	5,764	63.9	337,658	140,061	142	30	17.3	21
Great Northern	1931	8,342	601,008	608,476	19,817	19,109	66.7	1,158,539	522,171	482	137	22.1	131
	1930	8,339	729,035	744,565	41,530	23,002	66.6	1,366,264	607,812	466	147	24.0	70
Minn., St. P. & S. St. M.	1931	4,356	325,759	332,526	4,129	8,231	66.2	459,124	190,589	170	72	29.7	44
	1930	4,388	388,907	401,772	4,834	10,392	69.0	559,885	244,291	190	40	17.3	25
Northern Pacific	1931	6,458	523,079	555,043	36,583	16,451	70.3	938,467	408,540	411	119	22.5	90
	1930	6,472	634,944	675,160	47,006	20,053	70.7	1,128,538	497,238	420	99	19.1	55
Oreg.-Wash. R. R. & Nav.	1931	2,218	142,231	148,301	8,625	3,790	71.2	217,358	93,241	119	14	10.7	53
	1930	2,246	185,955	198,147	15,433	5,004	67.7	298,173	130,674	121	23	16.2	26
Central Western Region:												
Atch., Top. & S. Fe (incl. P. & S. F.)	1931	11,376	1,294,696	1,379,932	58,474	37,652	63.4	2,256,623	805,381	760	194	20.3	267
	1930	11,200	1,481,643	1,582,528	73,547	46,486	63.7	2,753,533	1,010,794	779	163	17.4	213
Chicago & Alton	1931	1,000	206,424	213,443	1,550	4,766	56.2	309,611	114,249	119	21	15.1	37
	1930	1,000	239,342	261,002	3,312	5,779	58.7	369,388	143,299	124	21	14.2	25
Chi., Burl. & Quincy	1931	9,270	1,077,928	1,104,461	33,931	32,832	61.0	1,961,413	863,588	601	131	17.9	77
	1930	9,310	1,284,211	1,344,437	51,549	39,538	60.6	2,399,724	1,070,108	647	148	18.6	27
Chi. Rock I. & Pacific	1931	7,593	1,039,279	1,069,573	5,995	26,135	59.8	1,609,451	602,399	487	148	23.3	122
	1930	7,592	1,294,840	1,346,338	10,957	31,997	61.5	1,922,733	743,335	531	133	20.0	55
Denver & R. G. Wn.	1931	2,569	186,429	202,009	19,519	4,924	61.2	314,479	132,083	221	24	9.6	77
	1930	2,562	232,244	274,783	48,011	5,875	58.1	389,964	164,354	203	60	22.6	24
Los Angeles & Salt Lake	1931	1,238	145,406	161,803	20,299	4,605	66.0	267,738	101,020	103	11	9.6	35
	1930	1,220	169,913	190,141	25,569	5,148	64.4	306,675	116,974	112	7	6.0	20
Oregon Short Line	1931	2,532	230,591	237,683	13,195	6,844	65.9	419,962	171,266	163	10	5.8	69
	1930	2,539	271,785	283,877	21,108	7,914	64.9	492,705	208,587	176	14	7.1	68
So. Pacific—Pacific Lines	1931	8,962	993,016	1,064,424	111,895	31,710	65.0	1,918,481	661,914	659	259	28.2	244
	1930	8,960	1,236,333	1,348,290	176,060	41,047	65.7	2,460,492	912,828	698	209	23.1	181
Union Pacific	1931	3,765	694,669	707,896	28,056	27,789	68.0	1,553,478	583,305	414	51	11.0	200
	1930	3,765	792,549	812,212	40,293	30,347	70.0	1,676,135	666,881	417	53	11.3	135
Southwestern Region:												
Gulf, Colo. & S. Fe	1931	1,965	171,737	177,235	3,348	4,644	65.3	279,052	115,124	101	18	15.1	37
	1930	1,932	221,760	235,769	6,293	7,783	66.0	480,800	214,334	103	19	15.6	20
Mo.-Kans.-Texas Lines	1931	3,176	298,414	302,328	3,593	8,646	59.2	521,687	194,041	167	61	26.5	84
	1930	3,176	354,413	360,177	6,975	11,135	58.5	673,933	252,253	189	54	22.3	88
Missouri Pacific	1931	7,423	1,097,127	1,123,323	29,385	32,194	62.0	1,935,830	748,770	549	100	15.4	219
	1930	7,424	1,371,107	1,409,894	32,554	39,640	61.9	2,465,601	1,007,048	534	89	14.3	126
St. Louis-San Francisco	1931	5,175	569,147	574,810	7,403	14,036	60.9	835,712	313,860	388	93	19.3	99
	1930	5,191	704,645	715,573	9,542	17,663	61.1	1,055,548	410,625	362	75	17.2	40
St. Louis Southwestern Lines	1931	1,902	211,942	216,614	2,967	5,985	57.4	368,182	116,300	95	31	24.5	22
	1930	1,805	275,599	276,299	4,027	7,230	69.3	383,648	135,662	100	24	19.3	7
Texas & New Orleans	1931	4,686	510,699	513,277	867	12,086	60.9	749,322	266,039	249	89	26.3	60
	1930	4,701	667,681	668,190	1,792	15,787	67.3	910,146	346,250	267	53	16.4	59
Texas & Pacific	1931	1,951	327,663	327,663	4,280	8,943	58.8	559,015	192,074	192	53	21.6	47
	1930	1,951	410,680	410,680	3,473	11,658	59.5	737,750	270,823	204	30	12.9	45

Compiled by Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Compared with February, 1930, for Roads with Annual Operating Revenues Above $25,000,000

Region, road and year	Average number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
New England Region:													
Boston & Albany.....1931	3,577	3,295	6,872	8.8	20,578	1,363	493	19.6	381	30.2	6,428	173	45.9
1930	4,187	3,855	8,042	5.1	19,034	1,295	480	20.2	390	29.9	7,700	172	60.8
Boston & Maine.....1931	11,478	8,195	19,673	8.3	22,098	1,748	657	20.5	368	26.5	3,504	125	45.2
1930	10,317	9,909	20,226	3.7	22,050	1,768	678	20.7	417	29.5	4,077	119	52.2
N. Y., New H. & Hart..1931	19,198	13,311	32,509	14.9	25,066	1,372	713	21.5	282	20.7	4,382	119	45.5
1930	16,835	14,409	31,244	10.1	24,398	1,879	711	21.4	330	24.9	4,889	118	52.1
Great Lakes Region:													
Delaware & Hudson.....1931	10,251	3,907	14,158	4.2	24,664	1,942	894	29.7	592	33.1	9,572	139	50.0
1930	9,550	5,447	14,997	3.8	24,415	1,932	916	29.9	681	36.3	11,677	143	61.4
Del., Lack. & Western..1931	19,116	5,054	24,170	5.2	24,644	1,857	764	24.0	433	27.5	10,484	159	61.4
1930	18,820	6,938	25,758	4.7	24,855	1,908	796	24.0	482	30.1	12,438	150	65.9
Erie (inc. Chi. & Erie)..1931	35,847	13,550	49,397	3.5	38,149	2,616	1,014	23.8	498	34.3	10,626	112	57.7
1930	34,732	18,086	52,818	3.1	34,606	2,572	1,035	24.5	564	37.2	12,866	119	66.7
Grand Trunk Western...1931	4,435	9,935	14,370	8.9	26,756	1,651	580	20.6	307	24.5	4,324	106	69.0
1930	3,778	11,123	14,901	6.1	23,754	1,615	599	20.6	397	29.6	5,797	115	85.0
Lehigh Valley 1931	21,607	6,384	27,991	7.8	28,316	1,875	774	25.9	416	26.2	8,669	155	52.0
1930	19,396	8,539	27,935	6.1	26,349	1,836	783	25.9	485	29.5	10,083	162	62.4
Michigan Central.....1931	26,295	16,968	43,263	5.2	34,437	1,888	645	19.7	202	16.8	4,674	116	64.8
1930	25,186	13,351	38,537	3.9	33,643	1,968	678	20.0	298	24.9	6,165	116	76.4
New York Central.....1931	80,750	59,893	140,643	8.7	33,532	2,308	936	25.5	373	24.5	8,102	109	48.4
1930	75,562	59,755	135,317	4.3	31,489	2,313	973	26.5	480	30.5	10,046	113	59.6
New York, Chi. & St. L..1931	15,692	8,056	23,748	6.3	30,328	1,921	672	20.9	467	37.9	6,674	107	70.1
1930	14,834	9,428	24,262	7.3	26,828	1,791	675	22.2	594	43.9	8,658	112	84.7
Pere Marquette.....1931	12,576	4,504	17,080	3.4	24,545	1,506	575	23.7	364	25.6	2,821	99	60.2
1930	10,717	7,575	18,292	3.6	22,199	1,502	618	25.4	488	31.3	4,100	110	73.8
Pitts. & Lake Erie.....1931	21,116	4,205	25,321	7.2	37,180	2,941	1,574	43.0	174	6.6	18,722	108	39.0
1930	16,310	6,113	22,423	8.1	34,938	2,731	1,495	43.5	263	10.5	25,445	121	64.9
Wabash 1931	20,615	8,811	29,426	6.2	33,174	1,742	592	20.1	445	36.2	5,241	116	58.1
1930	17,997	12,275	30,272	2.4	28,491	1,730	626	21.4	552	41.9	6,696	125	78.4
Central Eastern Region:													
Baltimore & Ohio.....1931	80,572	18,971	99,543	5.5	26,183	2,098	918	29.6	423	24.0	7,608	151	51.4
1930	75,104	25,365	100,469	4.9	24,367	2,032	922	30.7	530	28.7	9,617	154	62.5
Big Four Lines.....1931	25,353	22,201	47,554	4.6	31,615	1,981	874	28.5	367	21.4	6,407	116	50.6
1930	24,593	21,129	45,722	4.2	28,730	1,977	901	30.6	534	29.7	9,004	121	63.2
Central of New Jersey...1931	17,788	7,944	25,732	12.4	26,322	2,091	957	32.6	242	13.5	8,997	153	43.2
1930	17,566	10,268	27,834	5.0	25,189	1,992	914	32.3	280	15.4	11,246	156	52.9
Chicago & Eastern Ill....1931	6,083	2,640	8,723	7.8	26,583	1,590	665	26.6	459	28.2	4,267	131	39.7
1930	12,775	3,932	16,707	41.7	25,577	1,629	725	28.2	342	19.3	6,034	138	50.3
Elgin, Joliet & Eastern..1931	9,230	4,737	13,967	6.0	15,971	1,994	980	38.8	257	11.2	8,044	128	42.7
1930	9,724	7,977	17,701	4.4	14,462	2,104	1,070	39.4	273	11.6	10,643	137	53.7
Long Island 1931	751	4,723	5,474	1.2	6,583	880	342	28.9	83	5.4	1,131	331	34.5
1930	722	4,535	5,257	1.4	6,005	793	307	27.8	89	6.1	1,167	366	38.0
Pennsylvania System.....1931	240,278	55,198	295,476	5.3	30,814	2,274	997	29.5	359	20.1	9,942	132	51.2
1930	225,147	67,087	292,234	3.3	28,731	2,307	1,044	30.4	440	23.5	12,029	132	56.6
Reading 1931	35,929	10,148	46,077	3.6	23,934	1,971	939	35.5	371	18.4	11,810	150	55.1
1930	30,811	12,436	43,247	4.3	21,620	1,888	923	35.7	457	22.2	13,623	159	62.7
Pocahontas Region:													
Chesapeake & Ohio.....1931	48,411	7,880	56,291	2.5	39,735	2,942	1,540	44.1	879	37.0	15,873	91	51.2
1930	36,842	12,716	49,558	2.4	37,060	2,824	1,504	44.5	1,243	52.0	19,559	96	68.1
Norfolk & Western.....1931	39,825	5,863	45,688	.9	41,462	2,908	1,488	42.1	697	28.2	14,300	124	49.9
1930	33,499	9,061	42,560	.9	42,694	3,114	1,645	45.5	1,096	42.5	20,922	128	69.9
Southern Region:													
Atlantic Coast Line.....1931	28,028	8,416	36,444	5.8	22,122	1,336	435	18.6	290	27.5	2,049	115	52.6
1930	25,616	9,544	35,160	4.5	21,494	1,482	511	19.4	328	28.6	2,239	106	50.2
Central of Georgia.....1931	7,339	2,192	9,531	11.3	19,945	1,286	504	21.4	390	26.8	1,955	141	50.6
1930	5,857	3,424	9,281	6.2	19,472	1,352	557	21.8	504	32.4	2,464	138	56.3
Ill. Cent. (inc. Y. & M. V.)1931	52,291	14,669	66,960	7.3	25,563	1,659	662	26.4	484	30.3	4,858	141	57.1
1930	44,453	19,775	64,228	3.9	24,413	1,762	734	27.8	697	41.5	6,689	141	75.4
Louisville & Nashville....1931	51,822	8,828	60,650	11.7	20,586	1,422	646	31.5	415	22.8	4,773	154	59.8
1930	46,893	13,699	60,592	8.3	19,747	1,490	694	32.9	589	31.6	6,803	153	81.1
Seaboard Air Line.....1931	17,428	6,261	23,689	4.4	21,290	1,487	510	20.7	393	32.0	2,087	130	62.1
1930	15,895	8,092	23,987	3.8	19,639	1,480	551	21.5	444	32.6	2,373	131	67.7
Southern 1931	54,992	11,498	66,490	12.8	20,007	1,311	508	21.6	307	21.9	3,058	161	42.5
1930	52,362	15,392	67,754	12.0	19,817	1,387	541	22.7	379	26.8	3,846	159	51.7
Northwestern Region:													
Chi. & North Western...1931	53,631	20,176	73,807	8.1	21,440	1,540	584	22.5	286	20.5	2,492	137	45.0
1930	49,493	25,982	75,475	5.4	19,532	1,511	615	24.0	363	24.4	3,242	147	56.4
Chi. Gt. Western.....1931	4,765	3,518	8,283	5.6	32,650	2,034	726	21.8	669	52.6	3,797	125	62.2
1930	4,656	3,982	8,638	5.0	23,779	1,619	608	21.8	695	51.6	4,116	149	93.6
Chi., Milw., St. P. & Pac.1931	61,824	13,248	75,072	2.3	24,051	1,657	662	24.6	376	25.1	2,499	125	50.4
1930	54,584	18,719	73,303	3.1	22,435	1,684	680	25.0	479	31.6	3,123	138	60.6
Chi., St. P., Minn. & Om..1931	2,939	8,332	11,271	6.5	17,419	1,232	497	23.2	347	23.1	2,279	125	49.2
1930	2,701	9,786	12,487	9.7	15,470	1,162	482	24.3	401	25.8	2,902	137	68.5
Great Northern 1931	43,432	7,899	51,331	4.8	26,377	1,928	869	27.3	363	19.9	2,235	131	36.2
1930	42,484	9,207	51,691	5.4	23,805	1,874	834	26.4	420	23.9	2,603	146	45.8
Minn., St. P. & S. St. M. 1931	20,305	3,158	23,463	3.7	19,719	1,409	585	23.2	290	18.9	1,563	107	49.9
1930	19,534	4,515	24,049	3.2	17,950	1,440	628	23.5	363	22.4	1,988	117	63.1
Northern Pacific.....1931	43,025	4,635	47,660	9.4	25,941	1,794	781	24.8	306	17.5	2,259	148	39.9
1930	40,312	6,200	46,512	8.0	23,960	1,777	783	24.8	382	21.8	2,744	155	49.6
Ore.-Wash. R.R. & Nav..1931	7,916	2,192	10,108	5.6	22,639	1,528	656	24.6	329	18.8	1,502	165	42.0
1930	7,914	3,247	11,161	4.7	21,643	1,603	703	26.1	418	23.6	2,078	176	52.8
Central Western Region:													
Atch., Top. & S. Fe (incl. P. & S. F.).....1931	69,521	12,495	82,016	7.9	30,051	1,743	622	21.4	351	25.9	2,528	111	53.9
1930	64,678	16,456	81,134	6.5	29,614	1,858	682	21.7	445	32.1	3,223	112	62.8
Chicago & Alton.....1931	10,919	3,081	14,000	7.0	26,469	1,500	553	24.0	291	21.6	4,081	115	54.8
1930	9,999	4,001	14,000	5.0	23,764	1,481	575	24.8	366	25.1	5,119	129	65.1
Chi., Burl. & Quincy....1931	46,295	13,899	60,194	5.7	27,447	1,820	801	26.3	512	31.9	3,327	119	55.5
1930	44,396	18,323	62,719	4.4	26,291	1,869	833	27.1	609	37.1	4,105	128	62.7
Chi., Rock I. & Pacific..1931	38,716	12,117	50,833	7.9	24,087	1,549	580	23.0	423	30.7	2,833	140	60.5
1930	32,107	17,091	49,198	5.9	20,930	1,485	574	23.2	540	37.7	3,497	148	73.1
Denver & R. G. Wn.....1931	13,318	3,495	16,813	2.3	23,228	1,687	708	26.8	281	17.1	1,836	168	32.3
1930	12,157	4,888	17,045	2.8	20,127	1,679	708	28.0	344	21.2	2,291	182	43.9
Los Angeles & Salt Lake.1931	5,169	1,224	6,393	2.9	27,736	1,841	695	21.9	564	39.0	2,915	133	57.4
1930	5,417	1,417	6,834	2.6	25,590	1,805	688	22.7	611	41.8	3,424	141	64.7
Oregon Short Line.....1931	8,024	4,743	12,767	4.8	27,847	1,821	743	25.0	479	29.1	2,416	107	51.7
1930	8,465	5,365	13,830	2.9	26,952	1,813	767	26.4	539	31.5	2,934	117	57.6
So. Pacific—Pacific Lines.1931	42,385	23,579	65,964	5.1	28,351	1,932	667	20.9	358	26.4	2,638	121	45.7
1930	39,977	26,135	66,112	5.5	27,648	1,990	738	22.2	493	33.7	3,639	119	60.0
Union Pacific.....1931	25,818	7,127	32,945	12.4	43,156	2,236	840	21.0	632	44.3	5,533	107	56.5
1930	22,171	8,312	30,483	6.8	38,398	2,115	841	22.0	781	50.8	6,325	113	64.7
Southwestern Region:													
Gulf, Colo. & S. Fe.....1931	11,990	2,296	14,286	3.2	26,907	1,625	670	24.8	288	17.8	2,092	104	54.3
1930	11,941	3,631	15,572	4.0	31,347	2,168	967	27.5	492	27.0	3,963	98	71.2
Mo.-Kans.-Texas Lines...1931	14,943	3,662	18,605	5.5	27,440	1,718	650	22.4	372	28.0	2,182	87	47.9
1930	17,187	6,156	23,343	6.3	27,734	1,902	712	22.7	386	29.1	2,836	100	54.0
Missouri Pacific.....1931	34,150	13,958	48,108	9.9	28,910	1,810	682	23.3	556	38.6	3,603	121	63.4
1930	29,668	20,940	50,608	4.6	26,021	1,794	734	25.4	711	45.1	4,844	127	82.8
St. Louis-San Francisco..1931	27,791	6,614	34,405	3.0	22,251	1,468	551	22.4	326	23.9	2,166	140	43.3
1930	24,672	8,260	32,932	3.2	19,821	1,498	583	23.2	445	31.4	2,825	155	59.3
St. Louis Southwestern Lines 1931	7,211	3,329	10,540	7.9	26,769	1,737	549	19.4	394	35.3	2,184	101	62.1
1930	6,559	3,508	10,067	5.0	21,521	1,392	492	18.8	481	37.0	2,684	120	80.5
Texas & New Orleans....1931	12,544	13,154	25,698	5.2	22,427	1,467	521	22.0	370	27.6	2,027	96	54.3
1930	11,891	14,186	26,077	3.9	20,325	1,363	519	21.9	474	32.1	2,630	98	74.5
Texas & Pacific.....1931	6,734	4,576	11,310	8.1	26,479	1,706	586	21.5	607	48.0	3,517	90	48.5
1930	5,998	5,863	11,861	5.9	26,095	1,796	659	23.2	815	59.0	4,957	91	63.3

NEWS

Six Chicago Roads Supplement Trap-Car Service with Trucks

Six railroads serving the Chicago district have supplemented their trap-car service with motor truck service within the corporate limits of the city as a means of meeting motor truck competition and expediting L. C. L. shipments. As is the case with trap-car service, each of the railroads limits the highway service to industries located on its rails, receives only shipments from which it obtains a road haul from or to Chicago and makes a minimum weight limit of 6,000 lb. This service is expected to result in a reduction of from 12 to 24 hours in the handling of shipments to and from an industry.

The railroads participating are the Chicago & North Western; the Chicago, Burlington & Quincy; the Chicago Great Western; the Chicago, Milwaukee, St. Paul & Pacific; the Chicago, Rock Island & Pacific and the Minneapolis, St. Paul & Sault Ste. Marie. The Rock Island service is being handled by the Railway Express Agency, representing the first entry of the latter company into the revenue handling of L. C. L. shipments. Each of the other railroads is handling the service through various trucking contractors.

The North Western is trucking all outbound shipments to Proviso and all inbound shipments from the Grand Avenue station. The Milwaukee is handling both inbound and outbound shipments through the Union Street station, but expects within a short time to perform this service through Galewood.

State Privilege Tax on Interstate Buses Held Invalid

The Tennessee act of 1927 imposing a "privilege" tax on interstate motor buses operating over state highways, graduated according to seating capacity, was held invalid in a decision rendered by the Supreme Court of the United States on April 13 on the ground that the tax imposed had no relation to the proportionate use of the highways. The court said that since a state may demand of one carrying on an interstate business only fair compensation for what it gives, such imposition, although termed a tax, cannot be tested by standards which generally determine the validity of taxes and that, being valid only if compensatory, the charge must be necessarily predicated upon the use made, or to be made, of the highways of the state, and in the present case the tax was in no way dependent upon use since it did not rise with increase in mileage traveled or the number of passengers actually carried. Such a tax when applied to intrastate business, the court said, might be imposed without regard to whether it represents merely a fair compensation for the use of the highways.

The case involved an effort to tax eight buses operated in Tennessee by Interstate Transit, Inc.

P. R. R. Installs Co-ordinated Rail-Highway-Water Service

Co-ordinated freight service involving a joint movement by highway, steamship and rail, has been inaugurated by the Pennsylvania between Baltimore, via Love Point, and Salisbury, Md. The plan involves the use of detachable motor truck bodies which are interchangeable among highway, water and rail vehicles.

Under the new arrangement Baltimore shippers will load their eastern shore freight in truck bodies at their store doors, from which it will be moved by motor to Pier 5, Light street, where an especially designed crane will lift the entire truck body from the chassis or trailer to the deck of the steamer. After the trip across the Chesapeake Bay another crane will place the truck body on a railroad car for the rail movement to Salisbury. At that point the truck bodies will again be placed on a truck chassis or trailer and deliveries made by motor to the store doors of the consignees.

Regular service will be provided leaving Baltimore at 7:00 p. m. arriving at Salisbury early the next morning, and in the opposite direction leaving Salisbury at 7:00 p. m. and arriving at Baltimore early the following morning .

"The Pennsylvania, in inaugurating the new service," the announcement states "is utilizing rail and truck transport in the fields in which they are best adapted to economically and efficiently serve the public. The truck is at its best in congested terminal areas or for comparatively short hauls in the open country. The railroad affords a faster and cheaper means of transport on the long through hauls. The combination, therefore, of the two forms of transport, each in the field in which it is best adapted, is in the opinion of the Pennsylvania management, bound to result in lower cost to the public, faster schedules and greater flexibility and elasticity in the complete coordinated service rendered.

"Intensive studies are now being made by the Pennsylvania with the thought of extending the truck body service to other points on the railroad where it is demonstrated that such a coordination of freight trains and motor trucks will be efficient, economical and in the public interest."

Railroad Managers for Union Inland Terminal Appointed

Appointment and organization of a board of managers to represent trunk line railroads in the construction and operation of the Port of New York Authority's union inland freight station, to be located on Eighth and Ninth avenues and West Fifteenth and West Sixteenth streets, Manhattan, have been announced by John F. Galvin, chairman of the Port Authority, following receipt of notification from the railroads on the selection of their managers. This board of managers constitutes a permanent body to handle all matters for the railroads in connection with the union terminal, and was named by the presidents' conference committee, New York railroads, all members of which have signed an agreement with the Port Authority for the use of the union station.

The board has organized with the election of C. H. Stein, assistant to president, Central of New Jersey, as chairman; W. G. Curren, general manager, New York Terminal lines, Baltimore & Ohio, as vice-chairman, and A. J. Miller, supervisor of stations and transfers, Delaware, Lackawanna & Western, as secretary, the other members being H. J. Bordwell, general manager, New York district, Erie; M. J. Lynett, special agent, Lehigh Valley; A. E. Lloyd, general superintendent, New York terminal district, New York Central; George Marks, assistant to vice-president, New York, New Haven & Hartford, and R. B. M. Burke, supervisor of stations and transfers, New York zone, Pennsylvania.

"The appointment of this board," Mr. Galvin said, "is according to the terms of the agreement with the Port Authority as signed by the railroads on December 31, 1930, and in which it is set forth that the union station shall mean a place where consignees and shippers may receive and deliver l.c.l. freight transported by any or all of the carriers. The establishment of the station is looked on by the Port Authority as a long step toward making store-door delivery possible for carload freight." In accordance with another article in the agreement, the railroads have advised the Port Authority relative to details of design of the portion of the building that will be used for freight terminal purposes, and this will be one of the various matters to be handled between the board of managers and the Port Authority. Investigation and contacts concerning the union terminal have previously been carried on with the Port Authority by a subcommittee appointed two

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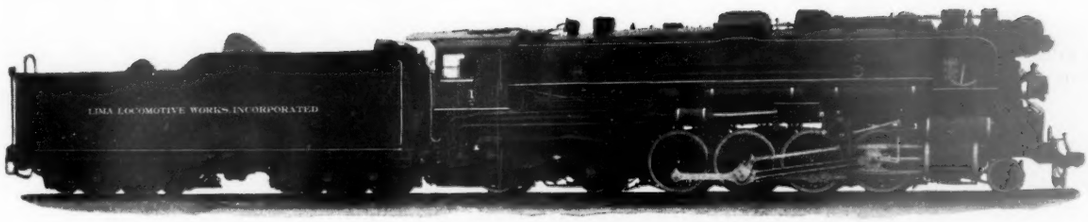
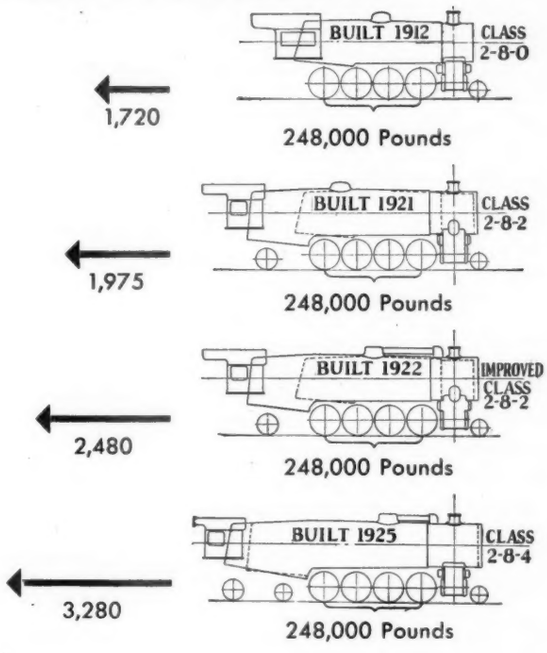
MORE POWER
for the
SAME WEIGHT



Maximum
Draw Bar Horse Power



This chart shows the

INCREASE IN HORSE POWER

that has been made possible with the

SAME DRIVING WHEEL WEIGHT

by the development of the Super-Power Locomotive.

Super-Power Locomotives are capable of delivering *maximum draw bar horse power* per unit of weight — making possible *increased train speed* together with *increased train tonnage* and great *economy in fuel.*

LIMA LOCOMOTIVE WORKS

Incorporated

LIMA - - - - - OHIO

LIMA LOCOMOTIVE WORKS INCORPORATED

years ago by the railroad presidents. This subcommittee now has ended its work with the completion of all negotiations for the establishment of the station.

Toronto Railway Club

The Toronto Railway Club will hold its April meeting at the Royal York Hotel, Toronto, on Monday evening, the 27th. D. Crombie, chief of transportation of the Canadian National, will address the meeting on "Some Other First Things"

Train-Wrecker Given Life Sentence

Superior Judge J. H. Swan at Henryetta, Okla., has sentenced to life imprisonment George Darnell, a track laborer, who pleaded guilty recently to causing the derailment of a passenger train of the St. Louis-San Francisco at Henryetta in August, 1929.

B. & M. Trains Speeded

The Boston & Maine's Green Mountain Flyer, between Boston and Montreal, over the Rutland is to be made 20 minutes faster; and northbound the train will be called the "Ethan Allen." With the new timetable, beginning April 26, several other trains are to be quickened.

James' Killers Sentenced

Frank Carson, who shot and killed Carl B. James, general development agent of the Louisville & Nashville, on February 23 after James had given him a ride in his automobile near Bardstown, Ky., has been sentenced to die in the electric chair. The companion of Carson was given a sentence of life imprisonment.

New York Central Shortens Schedule of "Iroquois"

The New York Central will add one to its fleet of 20-hour trains from New York to Chicago, the Iroquois, running over the Michigan Central, being quickened to make that time; leave New York 10:40 p. m., standard time, arrive in Chicago at 5:40 p. m. standard time. The Advance Century is to leave 15 minutes earlier than at present, westward, and to leave Chicago, eastward, 20 minutes earlier.

Club Meetings

The New England Railroad Club will hold its next meeting at the Copley Plaza Hotel, Boston, on Tuesday evening, May 12. This will be the annual banquet and entertainment.

The St. Louis Railway Club will hold its next meeting at the Statler Hotel, St. Louis, Mo., on Friday evening, May 8. W. H. Bremner, receiver of the Minneapolis & St. Louis, will speak on "Some of the Evils Now Confronting Railroad Transportation."

The Canadian Railway Club will hold its next meeting at the Windsor Hotel, Montreal, on Monday evening May 11. The speaker of the evening will be G. A. Powell, tranship clerk, Canadian Pacific, Smith's Falls, Ontario.

The Indianapolis (Ind.) Car Inspection Association will hold its next meeting at the Hotel Severin on Monday, May 5, at 7 p. m. A paper on Periodical Inspection of Brakes will be presented by E. L. Seal, inspector foreman, Pennsylvania Railroad.

Erie and Shipper Indicted Under Elkins Law

The Interstate Commerce Commission has made public copies of indictments returned recently by a grand jury in the federal court in New Jersey charging the Erie and Frederick W. Huber, Inc., of Brooklyn, N. Y., with violations of the Elkins act in allowing and receiving illegal concessions amounting to $4,822 in storage beyond the free time on shipments of flour at Weehawken, N. J., in 1928 and 1929.

St. Paul Passenger Association Extends Scope

The St. Paul, Minn. Passenger Association, which heretofore has restricted its membership to employees of steam railway passenger traffic departments, has extended the scope of its membership to include men employed in similar departments of bus companies, air lines, steamboat and street car companies and travel bureaus. The action was taken to bring the policies of the club in harmony with present trends in the transportation world.

Chicago to New Orleans, 54 Hours

The Chicago, Burlington & Quincy, the Gulf, Mobile & Northern and the New Orleans Great Northern have established third morning delivery on freight moving from Chicago to New Orleans, La., and Mobile, Ala., while a corresponding service has been offered between Kansas City and New Orleans. Cars leave Chicago at 9:30 p.m. and arrive in New Orleans at 3 a.m. the third morning. Returning they leave New Orleans at 10:30 p.m. and arrive in Chicago at 7 a.m. the third morning.

Public Service Commission Changes In Indiana and Missouri

Harry K. Cuthbertson of Peru, Ind., has been appointed a member of the Public Service Commission of Indiana to succeed Calvin F. McIntosh. Howell Ellis, now a member of the commission, has been appointed to succeed himself. John H. Porter of St. Louis, Mo., has been reappointed a member of Missouri Public Service Commission for a term expiring in April, 1937. S. M. Hutchison of Kansas City, whose term expired on April 15, has not been reappointed as a member of the commission.

New York to London in Six Days Via C. P. R.

The Canadian Pacific promises that passengers going to Europe in June, July or August by the company's steamship Empress of Britain, may leave New York at 4 p. m. on Fridays and expect to reach Europe on the following Thursday; Cherbourg at 7 a.m. and Southampton at 1 p.m. Leaving New York by the New York Central at 4 p.m., passengers will go over the Delaware & Hudson by special train from Troy, reaching Quebec in time for the sailing of the steamship at eight o'clock on Saturday morning; "only three days on the ocean."

Hold Up Work on C. N. R. Belt Line

The Canadian National has stopped work on its east end belt line in Montreal pending action by the Board of Railway Commissions on the appeal of Montreal authorities to require the structure to be depressed rather than elevated.

It appears that no injunction to that effect had been received from Ottawa and that none was necessary since this was implied in the decision of the Governor-General-in-Council when it set aside the original order of the Railway Commission to proceed with the work, and that the case be re-opened.

Extensive Store Door Service Planned

The Chicago, St. Paul, Minneapolis & Omaha plans to inaugurate store door pick up and delivery service for freight at St. Paul, Minn., Minneapolis, Mankato, Duluth and Worthington; at Superior, Wis., and Eau Claire; at Sioux Falls, S. D., and Mitchell; at Sioux City, Iowa, and at about 20 other business centers in those states and Nebraska, about June 1. The pick up rate will range from 5 cents to 25 cents per 100 lb., while the delivery will be performed at local cartage rates. If the service to and from these cities proves successful it is planned to extend it to all points on the company's lines.

Transport Secretary in Cabinet Suggested by Ripley

A new cabinet officer, a Secretary of Transportation, to take over the administrative functions of the Interstate Commerce Commission was advocated by Professor William Z. Ripley of Harvard University, in a lecture at Columbia University, New York City, on April 20.

Professor Ripley's lecture was concerned with a general discussion of current railway problems. He suggested that if the Interstate Commerce Commission were relieved of its administrative functions there would result a better enforcement of discipline in the railway industry, which is one of the things that it needs to get out of its present difficulties.

Taxation by Mileage Within District

The Supreme Court of the United States has sustained the validity of the Mississippi statute of 1926, c. 259, amending Laws 1914, c. 282, which had imposed a tax of $350 a mile on main lines in the Mississippi Levee District, the amending act fixing the tax at $50 a mile for a railroad having less than 25 miles of main line within the district. The Columbus & Greenville, defendant in an action to collect a tax for 1926 and 1927 at the rate of $350 a mile is held to fall within the amendment, as its main line in the district was only 18.41 miles in length. The judgment of the State Supreme Court, (154 Miss. 317, 122 So. 366) holding that the amending act was unconstitutional on the ground that the classification therein was arbitrary and unreasonable, and

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SLACK ...IS THE ENEMY of Pins and Bushings

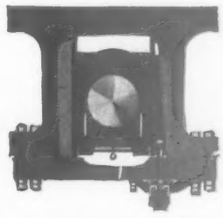
■ SLACK GROWS mighty fast, and as it grows the pound on rod bushings and on bearings increases. Soon the shop has a repair job on its hands.

■ *How can you keep out this slack?*

■ Not by close machining of boxes and careful adjustment of wedges, because even then the last fraction of an inch must be left to provide for expansion as box temperatures rise.

■ But Franklin Automatic Adjustable Wedges are set to eliminate any slack, and as driving boxes warm up, the automatic adjustment which takes place constantly provides for expansion without letting slack creep in.

■ All over the country, locomotives are running longer between shoppings by reason of the Franklin Automatic Adjustable Wedge.



Franklin Adjustable Driving Box Wedge

FRANKLIN RAILWAY SUPPLY COMPANY,
INCORPORATED

New York St. Louis Chicago San Francisco Montreal

therefore in violation of the due process and equal protection clauses of the Fourteenth Amendment to the Federal Constitution," was reversed. The court said that a classification of this sort has frequently been sustained — Columbus & Greenville v. Miller. Decided April 13, 1931. Opinion by Mr. Chief Justice Hughes.

Cotton Rate Case Re-opened

The Interstate Commerce Commission has re-opened its cotton rate investigation, in which it has prescribed a revision of cotton rates in the South and Southwest. This action is on a petition of the southern railways, for further hearing upon the question whether the findings and order shall be modified so as to permit the carriers to establish and maintain from Mississippi Valley points of origin to New Orleans reduced rates to meet the competition of motor trucks without observing the relation required between the rates on cotton from the Mississippi Valley to New Orleans on the one hand and Mobile on the other. The proceeding is assigned for further hearing at New Orleans on April 29 before Examiner G. H. Mattingly.

Chicago-Twin Cities Time Cut

The Chicago, Burlington & Quincy, the Chicago & North Western and the Chicago, Milwaukee, St. Paul & Pacific have placed their daylight trains on a schedule of 10 hr. 10 min. between St. Paul and Chicago. Formerly the time was 10 hr. 45 min. The trains affected included the Alaskan of the Burlington which has been named the Mississippi River View; the Viking of the North Western and No. 6 of the Milwaukee.

In addition, the Burlington has reduced the running time of trains 55 and 56 between Chicago and Kansas City, Mo., the reduction southbound being 2 hr. and Northbound 30 min. Coincident with these changes it has named these trains the American Royal.

Examiner Recommends Refusal of D. L. & W. Bus Permit

Examiner Jameson, in a proposed report to the Interstate Commerce Commission, has recommended denial of the joint petition of the Delaware, Lackawanna & Western and Morris & Essex, for authority to abandon a portion of the so called Rockaway loop of the M. & E. in New Jersey, and rejection of the accompanying plea for authority to substitute motor coach service for train service over a portion of this loop.

The petitioners were previously refused permission to discontinue the train service and substitute the bus by the Board of Public Utility Commissioners of New Jersey. The case was carried to the commission, however, because the parties involved held different views as to the jurisdiction of the State in the premises.

The bus service proposed would operate between Rockaway and Denville station under a contract arrangement with the Public Service Coordinated Transport. The proposed report states that while the commission has no jurisdiction over a partial discontinuance of rail service, such discontinuance in the pending application is an essential part of the line-abandonment proposal over which the commission has jurisdiction.

Board Appointed to Investigate Labor Dispute

President Hoover on April 16 issued a proclamation under the railway labor act declaring an emergency to exist by reason of a dispute between the Louisiana & Arkansas and certain of its employees represented by the Railway Employees' Department of the American Federation of Labor; and he has appointed an emergency board to investigate the matter, consisting of Charles Kerr, of Kentucky, Chester H. Rowell, of Berkeley, Cal. and Judge Homer B. Dibell, of St. Paul, Minn. This action was taken on information from the Board of Mediation that the employees had threatened to strike on April 18.

Birmingham Purchasing Agents Favor Railroads

The Purchasing Agents Association of Birmingham, Ala., on April 14, unanimously adopted a resolution recommending that all purchases made by its members be conditioned on their shipment by railroad. The resolution follows:

WHEREAS The railroad systems of the United States have been and still are one of the most if not the most important factor in stabilizing business and providing markets for American products; have been and yet are the most important factor in the development of this country; have been and yet are the greatest single contributors to the support of the state and local governments; and

WHEREAS, the railroads are permanently dedicated to the public service, form the basis of a vast investment securing life insurance equities and savings, and are entitled to the support of American industry and business.

RESOLVED, By the PURCHASING AGENTS ASSOCIATION OF BIRMINGHAM that this association does recommend that all purchases made by its members be made on condition that shipment be made by railroad, thus contributing to the maintenance of the railroads and the relief of the highways from danger and congestion, and that stamps or stickers to this effect be affixed to all orders;

RESOLVED, FURTHER, that copy of these resolutions be given to the Press.

Present Convention Rates Low Enough

The suggestion that convention rates be reduced from a fare and one-half to a fare and one-third was acted upon by a committee representing the New England, the Trunk Line, the Central, the Southeastern, the Southwestern, the Transcontinental and the Western passenger associations at a meeting at Cincinnati, Ohio, on April 14; but it was voted to leave the establishment of lower rates up to the individual associations, instead of establishing a fixed policy to be followed by all associations. Those opposed to the reduction felt that since the average convention fare at present is only about $30, the reduction, about $4, would not be large enough to secure much additional business and that the total revenue lost because of the lower rates would be greater than the revenue secured from the traffic stimulated.

Another problem considered at the meeting was the use of motor coaches in conjunction with steamship tours. As a result, an effort will be made to secure the co-operation of steamship companies operating such tours so that the patrons can be moved by rail to the point of embarkation.

Moving a Large Signal Tower

In connection with the enlargement and reconstruction of the yard at the North station passenger terminal of the Boston & Maine at Boston, the principal signal tower, Tower A, (electro-pneumatic) was moved back 35 feet, and the change in location was made without the least disturbance in the normal operation of the switches and signals. The movement to and from this terminal totals about 350 trains daily and the tower is a large three-story building. The number of wires and cables connected with it is about 640, which number includes electric wires to the switches and to the signals, submarine signal cable (two drawbridges being nearby) power charging circuit, telephone wires, electric lighting, telautograph and telegraph circuits. None of these wires could be put out of service, and the repair men simply cut in about 35 feet of slack in each wire. Three pipe lines also had to be attended to, one for cold water, one for hot water, and one for air; and to maintain these services without interruption, a flexible hose was used in each line.

The building mover took four days to make his preparations, and then, on March 11, the building was moved in about 3½ hours, by the use of a hand winch manned by six men. The operators in the tower said that they could not tell when the movement of the building started or when it ceased.

Thornton Challenges Critics

Sir Henry Thornton, president of the Canadian National last week laid down a challenge to criticis of the system's administration in a fighting speech to members attending the 53rd annual meeting of the Winnipeg Board of Trade. Officers of the company, he said, are ready to meet any criticism of it.

"With respect to the Canadian National Railway System," said Sir Henry, "the moment seems to be the open season." The C.N.R. has been built into a highly-efficient transportation machine in the last eight years—"one inspired by devotion to the people of Canada."

"Let those who would attack us hop to it," observed Sir Henry, quoting figures from financial statements of the company. in 1930, gross revenues were the same as in 1922, but expenses were less by $17,000,000. "If allowance is made for reductions in freight rates and for increased wages paid, we can say we have handled the same amount of business with $22,000,000 less expenses," he added.

Critics of the Canadian National, the railway chief asserted, had not watched the steady progress made by the system in recent years.

The world's current financial ailments he attributed to the mechanization of industry, commenced in the days when invention harnessed steam for the develop-

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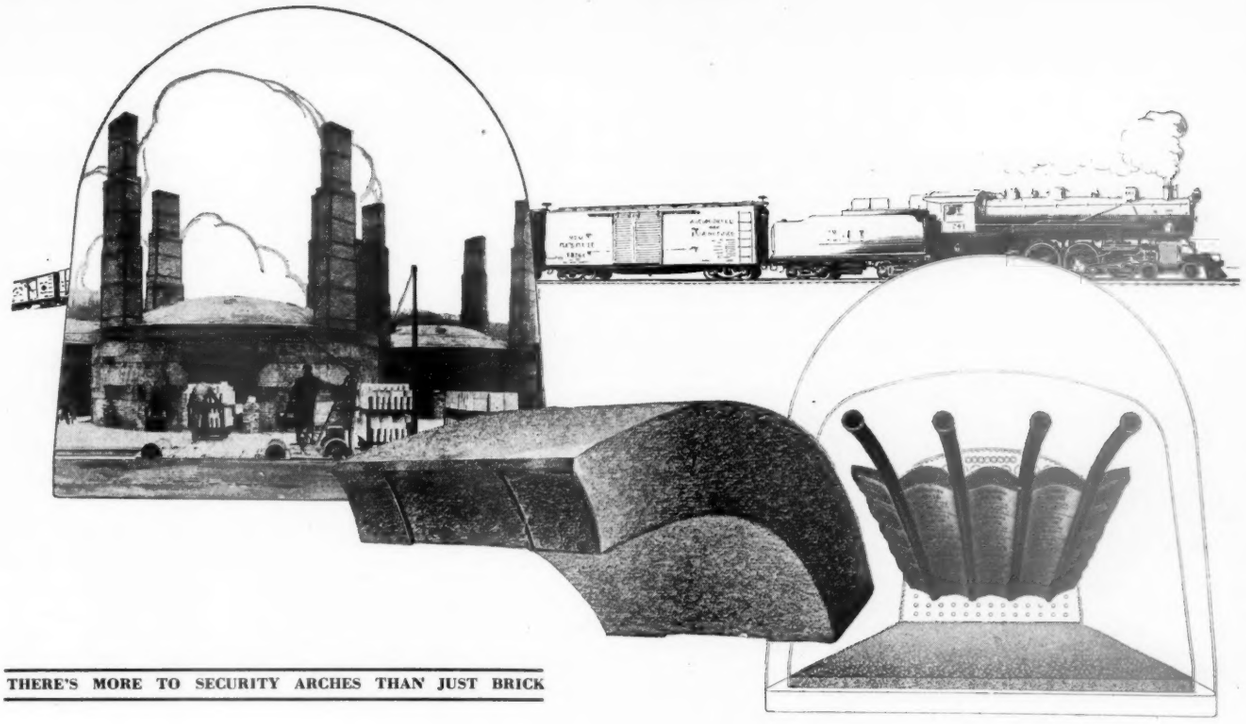

THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK

NOW *only* 1 *design instead of* 3

ENGINEERING and design are important factors in reducing inventory and in simplifying Arch Brick patterns.

On a road which has recently returned to American Arch Company service, it was found that three separate classes of engines were employing three different designs of Arch.

American Arch Company engineers quickly developed a single design to serve all three classes of locomotives, thereby substantially reducing Arch Brick patterns and inventory.

For 20 years American Arch Company combustion experts have been studying locomotives—every type and condition of service is familiar to them. Time and again this experience has proved of practical value to the user of Arch Brick.

HARBISON-WALKER REFRACTORIES CO.
Refractory Specialists

AMERICAN ARCH CO.
INCORPORATED
Locomotive Combustion Specialists

ment of power and the "frontiers of industry" were pushed to a vast extent. Conditions which confront Canada and the rest of the world have been mounting for decades, he said. Hands in industry have been eliminated until a crisis was necessarily reached.

"These circumstances," Sir Henry remarked, "produced an atmosphere of enmity between those who employed and those who worked. It led to warfare as stupid as military warfare. This condition was followed by a period when both parties tried to settle their disputes by co-operation rather than by foolish conflict."

The next step, which he termed "the most important economically" of the present time, is for capital to invite the partnership and co-operation of labor. The Canadian National, he said, had been a leader in this regard.

Prof. A. J. Wood Dies

Arthur J. Wood, head of the department of mechanical engineering at Pennsylvania State College, State College, Pa., died on Saturday, April 18, after having been struck by a motorcycle. Professor Wood was born at Newark, N. J., on September 3, 1874. He attended high school at Boonton, N. J., his education be-

A. J. Wood

ing continued at Stevens School (1892); Stevens Institute of Technology (M. E. 1896); Columbia University Graduate School (1898), and Pennsylvania State College (M. S. 1916). From 1896 to 1900 Professor Wood was on the staff of the Railroad Gazette, now the *Railway Age*. He was instructor of mechanical engineering at Worcester Polytechnic Institute from 1900 to 1902 and professor of mechanical engineering at Delaware College from 1902 to 1904. He went to Pennsylvania State College as assistant and associate professor of experimental engineering in 1904 and from 1910 to 1921 was associate professor and professor, railroad mechanical engineering, becoming head of the department during the latter year. Professor Wood was also consulting engineer for railroads and engineering companies. He was the author of Principles of Locomotive Operation; Pre-determination of Locomotive Performance; Investigation of Railroad Car Radiators; Researches in Heat Transmission; The Economical Thickness of Insulation in Refrigerator Cars, and numerous articles and papers on the design of insulation for refrigerator cars and methods of testing heat transmission. He was a member of the American Society of Mechanical Engineers and the American Institute of Refrigeration and a past president of the American Society of Refrigerating Engineers.

Railway Earnings for February

Class I railroads for the first two months of 1931 had a net railway operating income of $61,113,584, which was at the annual rate of return of only 1.96 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics. In the two months of 1930, their net was $115,354,043 or 3.79 per cent on their property investment. Operating revenues for the first two months totaled $702,532,066, compared with $879,601,331 for the same period in 1930, or a decrease of 20.1 per cent. Operating expenses amounted to $566,197,891, or a decrease of 17.6 per cent.

Fifty-seven Class I railroads operated at a loss of which 16 were in the Eastern district, 10 in the Southern and 31 in the Western.

For February the roads had a net of $27,264,467, at the annual rate of 1.67 per cent. In February, 1930, their net was $59,580,890, or 3.72 per cent. Operating revenues for February amounted to $336,632,312, compared with $428,142,544 in February, 1930, a decrease of 21.4 per cent. Operating expenses totaled $272,115,950, a decrease of 17.7 per cent.

Class I railroads in the Eastern district for the two months had a net of $34,862,821, at the rate of 2.43 per cent. For the same period in 1930, their net was $66,385,075 or 4.76 per cent. Operating revenues totaled $356,051,271, a decrease of 20.3 per cent, while operating expenses totaled $285,748,101, a decrease of 17.2 per cent. Class I railroads in the Eastern district for February had a net of $15,696,900 compared with $32,883,933 in February, 1930.

Class I railroads in the Southern district for the two months had a net of $6,458,818, at the rate of 1.21 per cent. For the same period in 1930, their net amounted to $15,708,807, at the rate of 2.94 per cent. Operating revenues in the Southern district for two months amounted to $92,299,429, a decrease of 21 per cent, while operating expenses totaled $76,664,985, a decrease of 16.5 per cent. Class I railroads in the Southern district for February had a net of $3,083,743, compared with $8,127,657 in February, 1930.

Class I railroads in the Western district for two months had a net of $19,791,945, at the rate of 1.73 per cent. For the same two months in 1930, they had a net of $33,260,161, at the rate of 2.99 per cent. Operating revenues for the two months amounted to $254,181,366, a decrease of 19.5 per cent, while operating expenses totaled $203,784,805, a decrease of 18.7 per cent. For February, the net in the Western district amounted to $8,483,824. The net of the same roads in February, 1930, totaled $18,569,300.

CLASS I RAILROADS—UNITED STATES

	Month of February 1931	1930
Total operating revenues	$336,632,312	$428,142,544
Total operating expenses	272,115,950	330,713,163
Taxes	26,953,845	28,679,751
Net railway operating income	27,264,467	59,580,890
Operating ratio — per cent	80.83	77.27
Rate of return on property investment	1.67%	3.72%
Two months ended February 28		
Total operating revenues	$702,532,066	$879,601,331
Total operating expenses	566,197,891	687,377,310
Taxes	54,242,940	58,106,538
Net railway operating income	61,113,584	115,354,043
Operating ratio — per cent	80.59	78.15
Rate of return on property investment	1.96%	3.79%

The C. N. R. in Parliament

Typical speeches by those who argue that there must be no political interference with the management of the Canadian National, Canada's big compulsory experiment in public ownership, and by those who, on the other hand, contend that the competition of this system, which is close to the Federal Treasury, with the private road, the Canadian Pacific, has not only been very costly to the latter but also to the people, have been made in the House of Commons at Ottawa in the last few days in the initial debate of the session on the Throne Speech. There was Ross W. Gray, a Liberal from Western Ontario, who demanded that Parliament declare against interference with the Canadian National management, and last week John T. Hackett, a Montreal Conservative, said what is in the minds of those who are frankly for the Canadian Pacific Railway.

Mr. Hackett said among other things:

"Recently there has been laid upon the table of the house a document called the annual report of the Canadian National Railway System. If there is one thing which has contributed more to the financial and fiscal difficulties of Canada, possibly even more than the war itself, it has been the rivalry in the construction and operation of railways. That rivalry, carried on under the smile and even the protection of government, brought about such a chaotic condition that government went into the business of transportation. I know full well that many members in this house will not agree with me; but I am of those who believe that if a government make wise laws and administer them wisely it has fulfilled the principal function of government. I believe that government should not enter competitive business, whether it be liquor, hydro-electric, transportation, or any other of a dozen ventures in which provincial governments are engaged at the present time. Be that as it may, it is well that we in this moment of depression, at a time when we are seeking for means to pay Canada's way, when our estimates have been cut, to use a very trite expression, to the bone, when all public works have been abandoned—it is well, I say, that we should take stock of this enterprise which is making such a

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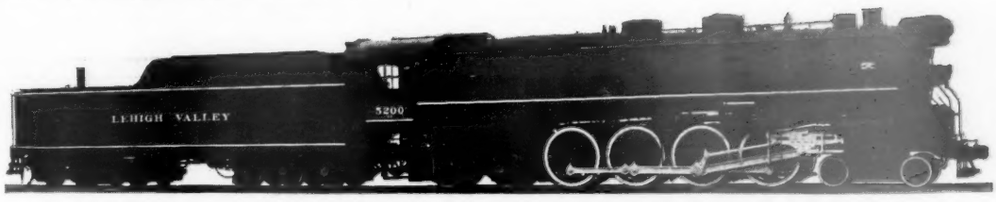
Alco Built



BUILT FOR THE LEHIGH VALLEY

Weight on Drivers, 268,000 pounds; Weight of Engines, 422,000 pounds; Cylinders 26 x 32 inches: Diameter of Drivers, 70 inches; Boiler Pressure, 255 pounds; Maximum Tractive Power with Booster, 85,060 pounds.

"FROM such data as are available, the best modern freight locomotives under intensive utilization may be expected to earn a net return on the investment ranging from 10 to 20 per cent, contributed largely from repairs, fuel and crew wages.

"A 120 million dollar annual investment in freight locomotives alone, providing 6000 new locomotives, in five years, would in that time effect a reduction in the average ton-mile cost of the freight movement of the United States of between 7 and 14 per cent, and with this saving in average costs would go an increase in train speed, the advantages of which, to the railroads and to the country, it would be difficult to evaluate."

If reductions in costs of operation are to continue, locomotive ownership must keep in step with the progress in locomotive efficiency.

Quoted from Railway Age—Jan. 3, 1931

American Locomotive Company

30 Church Street New York N.Y.

terrible drain upon our financial resources.

"I find in the statute of 1929 authorization for the construction of a passenger station and terminal in Montreal and I find even now that that consuming rivalry which has made such demands upon the fiscal and financial life of our country is about to grab another $100,000,000 for purposes of dubious utility. We find that a passenger station and terminals are to be built in the city of Montreal for the Canadian National Railways within a stone's throw of another railway's passenger station. If Montreal needs a terminal, it needs a union terminal. We have shut off immigration; we know that passenger traffic is dwindling; we know that automobile and air traffic is impinging upon the erstwhile predominance of locomotive traction and conveyance. We know that in spite of the spending of the millions necessary to the erection of this elaborate station not one additional passenger will be carried by the railways of Canada. All it means is this: that a few passengers may be attracted to that glittering monument from the rival across the way, and that that rival will have to erect a similar edifice of folly to protect itself against the allurements of this child of your statute. Is it necessary?

Declaring that there was uneasiness amongst the employees of the Canadian National Railways and also amongst those not employed by the road but interested in the welfare of the system because of the apparent attitude of the present Government toward the Canadian National Railways, Ross W. Gray, Liberal member for West Lambton (Ontario) and a former member of the House Committee on National Railways, last week said in the House of Commons that there have been rumours of political interference with the management of this railroad.

"If there is any way in which these rumours can be stopped, if by speeches of hon. members or by a statement from the hon. the Minister of Railways these rumours can be nailed, now is the time to do it. Coming as I do from a city where there is a large Canadian National terminal I may say that there is a feeling of uneasiness among employees that has not been noticed in many years past. During the years when the railway company was able to announce surpluses everybody wished to be known as a supporter of the Canadian National system. I believe it is our duty at a time of falling revenues to reiterate our faith in Sir Henry Thornton's management of the Canadian National Railways and to say as emphatically as we can that this parliament will not brook any political interference with his mangement."

B. & M. Leads in Centralized Traffic Control

The several installations of centralized traffic control recently installed on the Boston & Maine, with those now under construction will all be in service by July next, when the company expects to have in use 160 miles of line operated by this modern system. The total of the expenditures for these improvements will be about $2,608,000.

Equipment and Supplies

LOCOMOTIVES

THE CHICAGO, BURLINGTON & QUINCY is inquiring for one gas-electric locomotive.

THE CHICAGO, BURLINGTON & QUINCY has ordered three rail cranes from the American Hoist & Derrick Company.

THE UNION PACIFIC has ordered 20 locomotive tenders from the Baldwin Locomotive Works. The purchase of this equipment was authorized in its 1931 budget as reported in the *Railway Age* of March 21.

FREIGHT CARS

THE CANADIAN NATIONAL, which has adopted a program for constructing 250 refrigerator cars in its shops at Transcona, Man., is now completing the work at the rate of two cars per day.

THE THUNDER BAY QUARRIES COMPANY, Pittsburgh, Pa., has contracted with the Koppel Industrial Car & Equipment Company for six 25-cu. yd. capacity, two-way air dump cars for use at Alpena, Mich.

THE NORTHERN PACIFIC, reported in the *Railway Age* of November 29, 1930, as planning to carry out a car rebuilding program involving some 3,000 freight cars, now has under way this work, which will include new bodies for all the equipment. In addition to the 1,000 refrigerator cars being built at South Tacoma, Wash., and reported in 1930, the company is at work on 500 double-sheathed box cars at Brainerd, Minn.; 500 stock cars at the Como shop, St. Paul, Minn., for which 500 underframes were recently ordered from the Standard Steel Car Corporation; 500 single-sheathed box cars at Laurel, Mont., and 500 single-sheathed box cars at Brainerd, Minn. While the program calls for the rebuilding of these cars, the work amounts practically to the construction of new cars, since only trucks and air brakes will be salvaged from dismantled cars. All of this work is expected to be completed during 1931.

IRON & STEEL

THE BALTIMORE & OHIO is inquiring for 185 tons of structural steel for a warehouse at Cleveland, Ohio.

THE MISSOURI PACIFIC has ordered 250 tons of structural steel for use at Webster Grove, Mo., from the McClintic-Marshall Company.

THE GREAT NORTHERN has ordered 16,000 tons of rail from the Bethlehem Steel Company, and 9,000 tons from the Colorado Fuel & Iron Company.

THE MINNEAPOLIS & ST. LOUIS has ordered 1,000 tons of rails from the Inland Steel Company and 2,000 tons from the Illinois Steel Company.

THE WEST VIRGINIA NORTHERN has ordered 280 tons of structural steel for miscellaneous bridge work from the Virginia Bridge & Iron Company.

THE UNION PACIFIC has ordered 300 tons of structural steel for miscellaneous bridge work at Omaha, Neb., from the Paxton & Vierling Iron Works.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 500 tons of structural steel for a viaduct at Oklahoma City, Okla., from the Capitol Steel & Iron Works.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has ordered 253 tons of structural steel for miscellaneous bridge work from the Mt. Vernon Bridge Company.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 650 tons of structural steel for an ore dock at Marquette, Mich., from the McClintic-Marshall Company.

THE CHARLESTON & WESTERN CAROLINA has ordered 1,200 tons of steel from the American Bridge Company for its bridge over the Savannah river at Sandbar Ferry, near Augusta, Ga.

Supply Trade

The offices of the **American Railway Car Institute** have been moved from 61 Broadway to 19 Rector street, New York City.

George W. H. Allen has been elected a director of the **American Locomotive Company** to succeed the late Frederick H. Stevens.

The Alma Draft Gear Corporation will move its offices on May 1 from 110 East Forty-second street to 68 William street, New York.

Floyd K. Mays, vice-president of the **Bradford Corporation,** New York, has been elected president, to succeed **Horace Parker,** resigned.

The Galena Oil Corporation has moved its New York office from 41 East Forty-second street to 25 West Forty-third street.

The Patterson-Sargent Company has moved its New York office from 30 Church street to the Chrysler building, 135 East Forty-second street.

The Pressed Steel Car Company plans to rebuild part of its mill at Brandon avenue and 136th street, Chicago, which was destroyed by fire on April 8.

The American Steel & Wire Company has purchased the business and smelting plant of the **Edgar Zinc Company,** St. Louis, Mo. The smelter is located at Cherryvale, Kan.

Continued on Next Left Hand Page

A SYMBOL OF SAFETY

In the many plants of Carnegie Steel Company, Safety ranks equally with Production. To promote the practice of Safety, each year a handsome trophy is prepared which is awarded monthly to the plant which has the lowest accident record and is permanently awarded to the plant with the best yearly average. An 86% reduction in lost time accidents in 1929 compared to 1920, the year before this plan was adopted, shows the signal success with which the trophy plan has met.

The 1931 trophy, 30" high, is pictured above. A bronze group, representing the executive, the superintendent and the workman, stands before a silver cross-section of a rail flanked by two car wheels. The whole is mounted on a plinth of bronze beams. William Codman, noted designer of the Gorham Company, was the sculptor.

The inclusion of Carnegie Wrought Steel Wheels in the design of this trophy is a tribute to the remarkable safety record they have made in steam, electric and industrial service. Your safety program will be more effective if Carnegie Wrought Steel Wheels are included in specifications for your equipment.

CARNEGIE STEEL COMPANY - PITTSBURGH

Subsidiary of United States Steel Corporation

132

A. C. Motherwell, formerly in charge of forging plants at Detroit, Mich., and Flint, for the **General Motors Corporation,** has been appointed representative of the **Standard Forgings Company,** Chicago.

The Bucyrus-Erie Company, South Milwaukee, Wis., has taken over the manufacture and sales of the Loadmaster, a full-revolving boom crane, formerly marketed by **Frederic H. Poor, Inc.,** New York.

The Harnischfeger Sales Corporation, Milwaukee, Wis., will move its New York office on April 27, from the Hudson Terminal building, 50 Chuch street, to the Empire State building, Thirty-fourth street and Fifth avenue.

Alfred F. Howe, who retired as vice-president and general sales manager of the **Borden Company,** Warren, Ohio, in 1926 has been appointed western manager of this company, with headquarters at 717 Calmar avenue, Oakland, Cal.

Frank K. Tutt, district manager of the **Bird-Archer Company,** New York, with headquarters in that city, has been elected vice-president, with headquarters in Chicago. **H. C. Harrigan,** vice-president has been transferred to New York.

William T. Kilborn, formerly vice-president and general manager of sales of the Graham Bolt & Nut Company, has been elected vice-president in charge of sales of the **Hammond Bolt & Nut Corporation,** Hammond, Ind., with general offices in the Peoples Gas building, Chicago.

Stockholders of the **Reliance Manufacturing Company** approved the proposed merger of this company with the **Eaton Axle & Spring Company** at a meeting at Cleveland on April 20. The terms of the consolidation provide for the issuance of five shares of Eaton stock in exchange for four shares of Reliance.

R. E. J. Summers has resigned as vice-president and contract manager of the H. K. Ferguson Company to become president of **Summers Engineers & Constructors, Inc.,** with offices in the Terminal Tower building, Cleveland, Ohio, and in the Graybar building, New York. **Charles H. Fowler** is manager of the Cleveland office.

Alco Products, Inc., a division of the American Locomotive Company, has opened a district sales and construction office at 1203 Philtower building, Tulsa, Okla. **M. A. Hayes** is general superintendent in charge of construction; **T. B. Leech** is sales engineer. A similar office has been opened in the Esperson building, Houston, Tex., in charge of **R. H. Brinton.**

The operations of the **L. B. Fugitt Construction Company,** Chicago, and **Jerome A. Moss, Inc.,** Chicago, have been consolidated under the direction of **L. B. Fugitt,** president of the former company, who will act as vice-president in charge of operation of both construction companies. **Jerome A. Moss,** president of Jerome A. Moss, Inc., has been also elected secretary-treasurer of the L. B. Fugitt Construction Company.

The **Whitcomb Locomotive Company,** Rochelle, Ill., has been organized as a subsidiary of the Baldwin Locomotive Works to take over the George D. Whitcomb Company following purchase of the properties and going business at public auction on April 13. The company will continue to build gasoline, gas-electric, Diesel and Diesel-electric storage battery and trolley locomotives from three ton to 100 ton rating. The officers of the company are as follows: President, **George H. Houston,** president Baldwin Locomotive Works; Vice-President, **John P. Sykes,** senior vice-president, Baldwin; Vice-President and General Manager, **Harold H. Perry,** formerly vice-president, Industrial Brownhoist Corporation, Cleveland, Ohio; Secretary, **Arthur L. Church,** secretary and assistant treasurer, Baldwin; Treasurer **Charles E. Acker,** treasurer, Baldwin.

Safety Car Heating & Lighting Company

Net earnings of $820,860, after deducting administrative expenses and tax reserves, were reported by the Safety Car Heating & Lighting Company for the year ending December 31, 1930. After payment of dividends amounting to $788,960, there remained for surplus $31,900, thus bringing the surplus figure to $4,730,547.

Current assets at the close of the year totaled $4,761,372, of which $1,039,406 was in cash as against current liabilities of $124,986. The 1930 showing, the report says, was aided materially by the carry-over of business from 1929. It continues to point out, however, that practically no business has been carried over into the present year and current orders are below the normal average.

The report contains the following comment on the company's prospects for the future:

> The continued loss of passenger revenue on the part of railroads, and the evident change in transportation methods do not make for encouraging prospects in the sale of our ordinary lines of products.
>
> Future expansion must be in the development of other fields for present devices and new products. To the accomplishment of this we are directing our main effort, and we are encouraged by progress in this direction.
>
> Results obtained by the operation of iceless refrigerator cars continue to meet expectations. Eighty cars have been in continuous service, since April last year. Shipments of commodities requiring various temperatures have been made with uniformly excellent results.
>
> The operation of these cars requires an organization sufficient to handle a much larger number, but the purchase of additional equipment has been deferred pending the completion of developments which promise to make the refrigerating apparatus more efficient and consequently less expensive to produce and operate.
>
> Apparatus has been developed and tested for the refrigeration of trucks and trailers. This is now ready for marketing.

OBITUARY

Frederick V. Green, formerly vice-president of the Pittsburgh Testing Laboratory, died in New York City on April 16. Mr. Green served with the Westinghouse Air Brake Company at New York until 1918, and then became associated with the Baldwin Locomotive Works as export manager in charge of South African territory with headquarters at Johannesburg, South Africa. He subsequently became vice-president of the Pittsburgh Testing Laboratory with headquarters at New York, and in January, 1930, joined the force of the Gamewell Company, Newton Upper Falls, Mass., as a special representative in connection with railroad and industrial work. Later in the same year he also joined the force of the Triplex Safety Glass Company, Clifton, N. J., makers of laminated glass, in charge of its railway business in the eastern territory, with headquarters at New York.

Joseph R. Ellicott, for many years an official of the Westinghouse Air Brake Company, died of heart disease at his home at Ormond Beach, Fla., on April 16. Mr. Ellicott was born at Batavia, N. Y., in 1858, and was educated at the public schools of Grand Rapids, Mich. He started in business with the First National Bank of Grand Rapids, but in 1873 he entered the railroad field as a fireman on the Michigan Central. In 1877, he was appointed to a position in the claims department of the Chicago & North Western, and later became traveling auditor, first for the Chicago, St. Paul, Minneapolis & Omaha, and then for the Chicago & North Western. He then served successively as general manager of the Ajax Forge Company, Chicago; eastern sales manager of the Griffin Wheel & Foundry Company, at New York, and organizer and director of the General Agency Company, a railway supply company, New York. In 1898, Mr. Ellicott was appointed general manager of the Standard Air Brake Company. In 1901, this company was taken over by the Standard Traction Brake Company, which was in turn absorbed by the Westinghouse Air Brake Company. The Westinghouse Traction Brake Company succeeded the Standard Traction Brake Company in 1903, with Mr. Ellicott retained as manager, and in 1905, he was appointed New York district manager of both the Westing-

Joseph R. Ellicott

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Each Built to Carry Its Load

Over the cobblestones of old Amsterdam these ancient wheels carry their jouncing loads of milk, picturesquely if unfirmly. But for the endless miles of America's railroads, infinitely more exacting service demands the refinements, the safety and the efficiency of Gary Wrought Steel Wheels.

U S STEEL

Illinois Steel Company

Subsidiary of United States Steel Corporation

General Offices: 208 South La Salle Street, Chicago

house Traction Brake Company and the Westinghouse Air Brake Company. He remained in this position until 1919, when he asked to be relieved of active duty. Since then he had remained in a consulting capacity and for the past several years had made his home in Florida. He was president of the American Electric Railway Association for several terms. "Mr. Ellicott's death will be deeply regretted not only by his immediate associates but by his many friends in the railroad field," said H. H. Westinghouse, chairman of the Westinghouse Air Brake Company. "He was an able executive and a genial friend, and he played an important part in modern railroad development. Few men were more widely known or held in higher regard by the railroad officials and engineers of America."

Joseph B. Terbell, chairman of the board of the American Brake Shoe & Foundry Company, who died on April 15, was born at Corning, N. Y., in February, 1863, and was graduated from Hamilton College in 1884 with the degree of A.B. He then served with the Fall Brook Railroad, now part of the New York Central and later was vice-president of the Corning Iron Works. He became president in 1897 of the Corning Brake Shoe Company, and in 1902 when that company was merged with the American Brake Shoe & Foundry Company, he was elected vice-president of the latter company in charge of the western business with headquarters at Chicago. He subsequently served as vice-president at New York and in July, 1919, was elected president and in March, 1922, he became also chairman of the board. Mr. Terbell relinquished the duties of president in June, 1929, serving since that time as chairman of the board.

Joseph B. Terbell

TRADE PUBLICATIONS

GAS PLUS AIR.—A bulletin containing a thorough description of the new GA-3 machine, convertible to shovel, dragline, clamshell, or lifting crane, has recently been issued by the Bucyrus-Erie Company, South Milwaukee, Wis. The 20-page bulletin is attractively illustrated and gives considerable space to a discussion of the application of the gas-plus-air principle to the operation of excavators and cranes.

HANDBOOK OF CONCRETE CONSTRUCTION.—The Universal Atlas Cement Company, Chicago, has issued a handbook of 208 pages intended primarily for the builder of concrete and reinforced concrete, although it contains information on estimating that will prove of value to others. It presents in concise form practical instruction on the making of good concrete, details of form construction and useful suggestions on the use of concrete in various classes of structures.

Construction

ATCHISON, TOPEKA & SANTA FE.—A contract for the construction of a 4,000,000 bushel addition to a grain elevator at Kansas City, Kan., has been awarded to John S. Metcalfe Company, Chicago. The addition will be made up of 96 circular bins and 75 interstice storage spaces.

CANADIAN PACIFIC.—A contract has been awarded to the Page Construction & Equipment Company for the substructure and concrete work of a subway to carry Laviolette street, Three Rivers, Que., under the C. P. R. tracks.

CHICAGO, ROCK ISLAND & PACIFIC.—A contract for the construction of a water station at Shoal Creek, Mo., has been awarded to the Railroad Water & Coal Handling Company, Chicago. This project, which will involve a total expenditure of about $35,000, includes a pump house and pumps, a steel tank, water and sewer lines, a water treating plant and the driving of a well. A contract for the placing of 66,000 lin. ft. of tiling on the line between Nettleton, Mo., and Moseby has been awarded to the Cook-O'Brien Construction Company, Kansas City, Mo.

LOUISVILLE & NASHVILLE.—A contract for the construction of piers and abutments for a new double-track bridge over the Ohio river at Henderson, Ky., has been awarded to the Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

MISSOURI PACIFIC.—The Arkansas State Highway Commission will open bids on April 29 at Little Rock, Ark., for the construction of a reinforced concrete highway viaduct over the tracks of this company on the Hope-Prescott road, Highway No. 67, one mile northeast of Hope, Ark. The viaduct will be 177 ft. long without approaches.

NEW YORK CENTRAL.—The New York Public Service Commission has approved specifications and cost estimates for work covering the grading for a coach yard, team track and freight yard, to be located between Peat street and Midler avenue, in connection with this company's general program of grade separation in Syracuse, N. Y. The commission has also approved specifications and estimates of cost for the elimination of crossings at Main street, Savannah, N. Y., and Gouverneur street, Canton, N. Y., and has added to the list of crossings to be considered for elimination during 1931 the Belle Isle crossing in Camillus, N. Y., and the Kashong crossing, Geneva, N. Y.

NEW YORK, NEW HAVEN & HARTFORD.—The Jeanettes crossing of this company's line and the Fishkill Plains-East Fishkill county highway, just west of Hopewell Junction station, East Fishkill, N. Y., has been designated for elimination by the Public Service Commission of New York. Elimination will be accomplished by constructing an overhead highway crossing about 590 feet west of the present crossing, and a pedestrian subway, at a total estimated cost of $120,000.

PENNSYLVANIA.—A contract for the construction of a subway under this company's tracks at their intersection with the relocated extension of State Highway No. 7, Steubenville, Ohio, has been awarded to the H. E. Culbertson Company, Cleveland, Ohio. The work will cost about $65,000. The Wheelers Road crossing of the Pennsylvania in Sardinia, N. Y., has been added to the list of grade crossings to be considered for elimination during 1931 by the Public Service Commission of New York.

WABASH.—Preliminary plans have been prepared for the construction of a highway subway under the tracks of this company at North Main street, Decatur, Ill., at a cost of about $148,000.

WABASH.—A contract has been awarded to the Walsh Construction Company, Indianapolis, Ind., for about 1,000,000 cu. yd. of grading for a new double track line, about three miles in length, which will serve as the east approach to the new bridge under construction over the Missouri river at St. Charles, Mo. It is expected that bids for construction of the superstructure of the bridge will be requested from contractors at an early date.

WESTERN PACIFIC (Western Pacific California).—This company plans to begin construction about July 1 of a new line between San Francisco, Cal., and Niles, following the extension by the Interstate Commerce Commissin to that date of the time within which the Western Pacific must negotiate with the Southern Pacific for trackage rights over the latter's Dumbarton bridge over San Francisco bay.

THE PENNSYLVANIA FERRIES between Cape Charles, Va. and Norfolk, beginning April 26, will make five round trips a day, the southbound departures being scheduled at 6 a.m.; 7:40 a. m.; 1 p. m.; 4:25 p. m. and 8:45 p. m. This trip across Chesapeake Bay takes about three hours, the boats all stopping at Old Point Comfort. Since the completion of the Atlantic Coastal highway to Cape Charles, last December, automobile traffic across the Bay has increased rapidly and these boats now carry about 1,200 automobiles a month. The largest of the three vessels the Virginia Lee, has accommodations for 65 automobiles, while the other two can carry 35 each.

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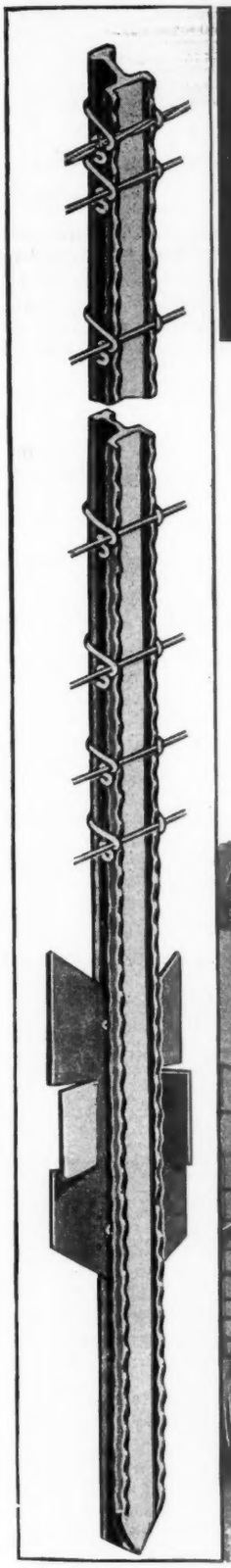
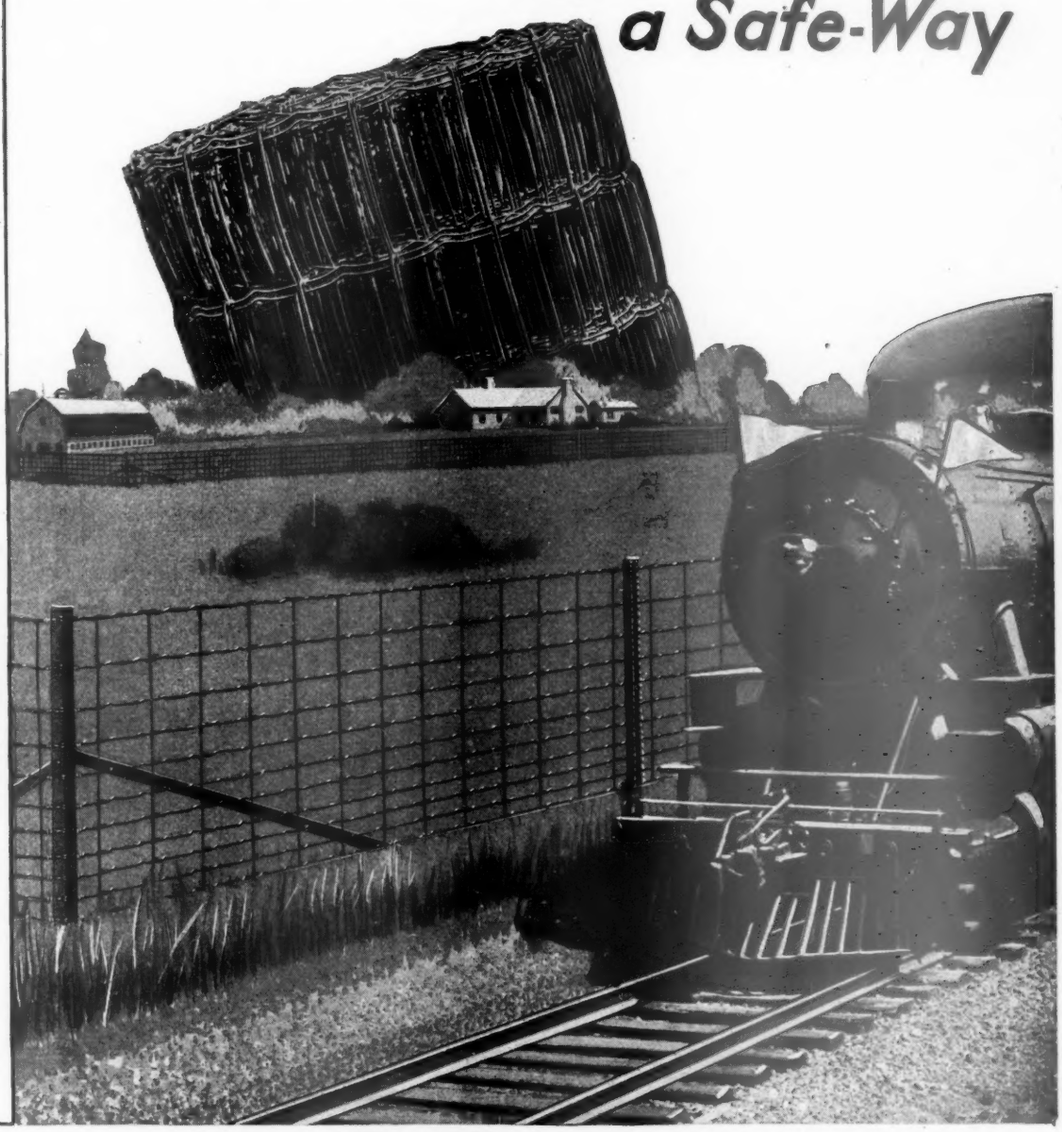


AMERICAN Fence and BANNER STEEL POSTS

IT is cheaper to put up a good fence than to pay stock claims. Likewise it is economy to buy adequate protection—proved protection—such as that offered by American Railroad Fence and Banner Steel Line Posts—the post of railroad rail construction. These products including National Expanding Anchor End and Corner Posts meet every specification recommended by the American Railway Engineering Association.

Make Your Right-of-Way - - a Safe-Way



1831 COMMEMORATING 100 YEARS of PROGRESS IN WIRE MAKING 1931

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago SUBSIDIARY OF UNITED STATES STEEL CORPORATION And All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco *Export Distributors:* United States Steel Products Company, New York

Financial

ATLANTIC COAST LINE.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority for the certification and delivery of $1,734,123 of general unified mortgage 4½ per cent bonds, to be held in the treasury.

BELT RAILWAY OF CHICAGO.—*Annual Report.*—The annual report of this company for 1930 shows net income, after interest and other charges, of $187,200, or the same as 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
RAILWAY OPERATING REVENUES	6,803,386	8,299,173	—1,495,786
Maintenance of way	574,596	737,516	— 162,919
Maintenahce of equipment	715,378	906,505	— 191,127
Transportation	3,201,309	3,743,376	— 542,067
TOTAL OPERATING EXPENSES	4,678,118	5,608,791	— 930,672
Operating ratio	68.76	67.58	+ 1.18
NET REVENUE FROM OPERATIONS	2,125,267	2,690,381	— 565,114
Railway tax accruals	648,751	683,786	— 35,035
Railway operating income	1,476,021	2,004,934	— 528,912
Hire of freight cars—Cr.	188,398	200,114	— 11,715
Non-operating income	689,615	129,312	+ 560,302
GROSS INCOME	2,165,637	2,134,247	+ 31,389
Rent for leased roads	1,761,420	1,762,782	— 1,361
Interest on funded debt	10,880	.....	+ 10,880
TOTAL DEDUCTIONS FROM GROSS INCOME	1,978,437	1,947,047	+ 31,389
NET INCOME	**187,200**	**187,200**	.....

CHICAGO & WESTERN INDIANA.—*Annual Report.*—The annual report of this company for 1930 shows net income, after interest and other charges, of $430,130, as compared with net income of $464,804 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
RAILWAY OPERATING REVENUES	174,018	216,037	—42,018
Maintenance of way	20,469	20,564	— 95
Maintenance of equipment	124,638	127,225	— 2,587
Transportation	163,955	172,742	— 8,787
TOTAL OPERATING EXPENSES	319,375	330,484	—11,108
Operating ratio	183.53	152.98	+ 30.55
NET LOSS FROM OPERATIONS	145,357	114,447	+30,910
Hire of freight cars, Dr.	2,186	4,526	— 2,339
Joint facility rents	2,587,782	2,537,881	+49,901
Non-operating income	4,853,489	4,821,676	+31,812
GROSS INCOME	4,708,132	4,707,229	+ 902
Rent for leased roads	133,718	116,932	+16,786
Interest on funded debt	3,288,451	3,308,869	—20,418
TOTAL DEDUCTIONS FROM GROSS INCOME	4,278,001	4,242,425	+35,576
NET INCOME	430,130	464,804	—34,674

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*New Director Elected.*—Ray N. Van Loren, vice-president and general counsel of the Omaha, and of the Chicago & North Western, has been elected a member of the board of directors of the former company.

CHICAGO GREAT WESTERN.—*Annual Report.*—The annual report of this company for 1930 shows net income, after interest and other charges, of $1,309,205, as compared with net income of $1,235,879 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage operated	1,495.27	1,495.27	—
RAILWAY OPERATING REVENUES	22,830,320	25,825,336	—2,995,016
Maintenance of way	3,345,431	3,406,912	— 61,480
Maintenance of equipment	2,772,638	4,372,252	—1,599,614
Transportation	8,776,051	10,279,126	—1,503,074
TOTAL OPERATING EXPENSES	16,580,398	19,867,072	3,286,673
Operating ratio	72.62	76.93	— 4.31
NET REVENUE FROM OPERATIONS	6,249,921	5,958,264	+ 291,657
Railway tax accruals	1,085,000	1,099,202	— 14,202
Railway operating income	5,162,653	4 855,789	+ 306,863
Hire of freight cars—Dr.	1,292,380	1,084,201	— 208,179
Joint facility rents—Net	950.796	885,271	+ 65,525
NET RAILWAY OPERATING INCOME	2,853,178	2,801,534	+ 51,644
Non-operating income	225.965	260,801	— 34,835
GROSS INCOME	3,079,144	3,062,335	+ 16,808
Rent for leased roads	77,724	77,690	+ 34
Interest on funded debt	1,630.021	1,695,762	— 65,740
TOTAL DEDUCTIONS FROM GROSS INCOME	1,709,939	1,826,455	— 56,516
NET INCOME	1,309,205	1,235,879	+ 73,325

DULUTH, MISSABE & NORTHERN.—*Annual Report.*—The annual report of this company for 1930 shows net income, after interest and other charges, of $7,409,201, as compared with net income of $9,468,511 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
RAILWAY OPERATING REVENUES	$20.975,406	$20,606,294	+ 369,112
Maintenance of way	2,887,171	1,808,105	+1,079,065
Maintenance of Equipment	3,678,243	2,265,205	+1,413,038
Transportation	4,345,534	3,375,270	+ 970,263
TOTAL OPERATING EXPENSES	11,534.072	7,826,406	+3,707,665
NET REVENUE FROM OPERATIONS	9,441,334	12,779,888	—3,338,553
Railway tax accruals	1,778,958	1,872,759	— 93,801
Railway operating income	7,662,359	10,907,128	—3,244,769
Equipment rents and Joint Facility rents—Net Cr.	44,244	(Dr.)4,006	+ 48,251
NET RAILWAY OPERATING INCOME	7,706,604	10,903,121	—3,196,517
GROSS INCOME	8,875,735	11,986,646	—3,110,911
Rent for leased roads	1,380,116	206,515	+1,173,600
Interest on funded debt	245,143	274,258	— 29,115
TOTAL DEDUCTIONS FROM GROSS INCOME	1,466,533	2,518,135	—1,051,602
NET INCOME	7,409,201	9,468,511	—2,059,309

FLORIDA EAST COAST.—*Annual Report.*—The annual report of this company for 1930 shows net deficit, after interest and other charges, of $1,998,312, as compared with net deficit in 1929 of $1,325,259. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage operated	863.37	854.72	+8.65
RAILWAY OPERATING REVENUES	$11,720,810	$13,446.014	—1,716,204
Maintenance of way	1,732,508	2,247,163	— 514,654
Maintenance of Equipment	2,238,776	2,262,521	— 23,744
Transportation	3,574,294	3,836,965	— 262,671
TOTAL OPERATING EXPENSES	8,614,204	9,437,666	— 823,461
Operating ratio	73.4	70.2	+ 3.2
NET REVENUE FROM OPERATIONS	3,115,606	4,008,348	— 892,742
Railway tax accruals	1,330,078	1,544,865	— 214,786
Railway operating income	1,778,349	2,401,336	— 622,986
Hire of Equipment—net Dr.	676,643	707,504	— 30,861
Joint Facility rents—net Dr.	61,552	55,870	+ 5,681
NET RAILWAY OPERATING INCOME	1,040,154	1,637,960	— 597,806
Non-operating income	150,564	100,541	+ 50,022
GROSS INCOME	1,190,718	1,738,502	— 547,784
Interest on funded debt	3,072,400	2,962,232	+ 110,167
TOTAL DEDUCTIONS FROM GROSS INCOME	3,189,031	3,063,761	+ 125,269
NET DEFICIT	1,998,312	1,325 259	— 673,053

FORT WORTH BELT.—*Excess Income.*—The Interstate Commerce Commission has made public a tentative recapture report finding that this company in the years 1920 to 1927, inclusive, earned $502,439 in excess of 6 per cent on its valuation and has ordered it to pay half that amount to the commission unless a protest is filed.

GULF, MOBILE & NORTHERN.—*Application of E. N. Brown To Serve As Director Withdrawn.*—E. N. Brown, chairman of the St. Louis-San Francisco, has withdrawn his application to the Interstate Commerce Commission for authority to serve as director of the Gulf, Mobile & Northern while also serving as director of the Frisco and the Rock Island, after receiving a letter from Oliver E. Sweet, director of the commission's Bureau of Finance, expressing the opinion that the commission would not approve the application on the ground of the competition between the Frisco and the G. M. & N., on traffic to and from Mobile. Mr. Brown said in his reply that it was felt that with the interest of the Burling-

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■ BY COMBATING the two principal causes of tube renewals, Toncan Iron boiler tubes reduce boiler maintenance costs.

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ton in the G. M. & N., the interest of the Frisco might be seriously jeopardized unless it had representation but that he did not wish to press the matter at this time, although he believed he could convince the commission that the situation is such that neither public nor private interests would be adversely affected by the granting of the application.

GULF, MOBILE & NORTHERN.—*Annual Report.*—The annual report of this company for 1930 shows net income after interest and other charges, of $261,500, as compared with net income of $1,071,399 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage operated	733.92	733.92	—
RAILWAY OPERATING REVENUES	5,897,615	7,631,222	—1,733,606
Maintenance of way	991,588	1,065,941	— 74,353
Maintenance of equipment	956,255	1,148,445	— 192,189
Transportation	1,954,496	2,267,446	— 312,949
TOTAL OPERATING EXPENSES	4,566,790	5,240,213	— 673,422
Operating ratio	77.43	68.67	+ 8.76
NET REVENUE FROM OPERATIONS	1,330,824	2,391,008	—1,060,183
Railway tax accruals	325,206	512,949	— 187,743
Railway operating income	1,004,997	1,876,396	— 871,398
Equipment rents—Net	206,608	288,177	+ 81,569
Joint facility rents—Net	167,270	158,269	— 9,000
NET RAILWAY OPERATING INCOME	631,118	1,429,949	— 798,830
Non-operating income	101,761	42,114	— 59,646
GROSS INCOME	732,879	1,472,064	— 739,184
Interest on funded debt	441,666	370,000	+ 71,666
TOTAL DEDUCTIONS FROM GROSS INCOME	471,379	400,665	+ 70,714
NET INCOME	261,500	1,071,399	— 809,899

MINNEAPOLIS & ST. LOUIS.—*Notes.*—W. H. Bremner, receiver, has applied to the Interstate Commerce Commission for authority to issue 96 promissory notes for $2,464.66 each at 6 per cent, to mature monthly from June 1, 1931, to May 1, 1939, to pay the unpaid balance on 100 flat cars.

NEW ORLEANS GREAT NORTHERN.—*Annual Report.*—The annual report of this railroad for 1930 shows net deficit after interest and other charges, of $185,081, as compared with net deficit of $82,687 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage operated	267.68	276.69	— 9.01
RAILWAY OPERATING REVENUES	2,778,287	3,262,755	— 484,468
Maintenance of way	355,300	536,247	— 180,947
Maintenance of equipment	484,849	576,030	— 91,181
Transportation	887,038	976,784	— 92,745
TOTAL OPERATING EXPENSES	2,008.392	2,402,415	— 394,022
Operating ratio	72.29	73.63	— 1.34
NET REVENUE FROM OPERATIONS	769,894	860,340	— 90,446
Railway tax accruals	166,667	201,430	— 34,763
Equipment rents—Net	250,454	223,479	— 26,974
Joint facility rents—Net	97,548	79,081	— 18,466
NET RAILWAY OPERATING INCOME	254,983	355,711	— 100,728
Non-operating income	8,382	6,273	+ 2,109
GROSS INCOME	263,366	361,985	— 98,619
Interest on funded debt	422,024	407,000	+ 15,024
TOTAL DEDUCTIONS FROM GROSS INCOME	448,447	444,672	+ 3,774
NET DEFICIT	185,081	82,687	— 102,393

READING. — *Operation.* — The Interstate Commerce Commission has authorized this company to operate a line extending from a connection with its Shamokin, Sunbury & Lewisburg branch, 1.7 miles north of its Lewisburg (Pa.) station, westward 2.3 miles to a new federal prison.

SOUTHERN PACIFIC.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $50,000,000 of 4½ per cent bonds, maturing in 1981. The issue is authorized for sale to Kuhn, Loeb & Company at 94.25, making the average annual cost to the railroad approximately 4.80 per cent.

TENNESSEE CENTRAL.—*Annual Report.*—The annual report of this company for 1930 shows net income, after interest and other charges, of $127,756, as compared with net income of $219,904 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage Operated	295.95	296.33	— .38
RAILWAY OPERATING REVENUES	3,064,838	3,330,262	—265,424
Maintenance of way	546,293	592,339	— 46,046
Maintenance of equipment	468,326	517,643	— 49,317
Transportation	1,081.941	1,167,138	— 85,197
TOTAL OPERATING EXPENSES	2,366,757	2,514,783	—148,026
Operating ratio	77.22	75.51	+ 1.71
NET REVENUE FROM OPERATIONS	698.081	815,479	—117,398
Railway tax accruals	82,428	95,424	— 12,996
Railway operating income	615,548	719,729	—104,181
Hire of freight cars—Dr.	204,327	222,177	— 17,850
Joint facility rents	5,491	5,371	+ 120
Non-operating income	31,259	32,541	— 1,282
GROSS INCOME	646,808	752,270	—105,462
Rent for leased roads	62,504	62,504	.....
Interest on funded debt	230,662	218,494	+ 12,168
TOTAL DEDUCTIONS FROM GROSS INCOME	519,052	532,365	— 13,313
NET INCOME	127,756	219,904	— 92,148

VIRGINIAN.—*Annual Report.*—The annual report of this company for 1930 shows net income, after interest and other charges, of $4,455,872, as compared with net income of $5,752,783 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage Operated	554.81	545.16	+ 9.65
RAILWAY OPERATING REVENUES	17,455,269	19,871,636	—2,416,367
Maintenance of way	1,749,498	1,951,724	— 202,226
Maintenance of equipment	3,029,327	3,593,529	— 564,202
Transportation	3,603,795	3,901,411	— 297,616
TOTAL OPERATING EXPENSES	8,940,504	9,981,399	—1,040,895
Operating ratio	51.22	50.23	+ .99
NET REVENUE FROM OPERATIONS	8,514,764	9,890,236	—1,375,472
Railway tax accruals	2,007,000	2,036,000	— 29,000
Railway operating income	6,507,712	7,853,952	—1,346,240
Hire of equipment—net	821,897	881,913	— 60,016
GROSS INCOME	8,470,850	9,723,460	—1,252,610
Interest on funded debt	2,935,950	2,767,200	+ 168,750
TOTAL DEDUCTIONS FROM GROSS INCOME	4,014,977	3,970,676	+ 44,301
NET INCOME	4,455,872	5,752,783	—1,296,911

WESTERN MARYLAND.—*Annual Report.*—The annual report of this company for 1930 shows net income, after interest and other charges, of $1,960,974, as compared with net income of $2,917,822 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average Mileage operated	895.43	875.18	— 20.25
RAILWAY OPERATING REVENUES	17,792,693	18,985,706	—1,193,012
Maintenance of way	2,580,968	3,041,864	— 460,896
Maintenance of equipment	3,303,821	3,640,116	— 336,294
Transportation	4,656,478	4,954,666	— 298,187
TOTAL OPERATING EXPENSES	11,638,561	12,687,142	—1,048,581
Operating ratio	65.41	66.83	— 1.42
NET REVENUE FROM OPERATIONS	6,154,132	6,298,563	— 144,431
Railway tax accruals	1,014,210	1,056,501	— 42,291
Railway operating income	5,139,921	5,242,061	— 102,140
Hire of equipment	310,164	801,489	— 491,324
NET RAILWAY OPERATING INCOME	5,253,238	5,824,583	— 571,344
Non-operating income	169,862	194,902	— 25,040
GROSS INCOME	5,423,100	6,019,485	— 596,385
Rent for leased roads	89,130	89,130	—
Interest on funded debt	2,599,515	2,602,307	— 2,791
TOTAL DEDUCTIONS FROM GROSS INCOME	3,462,126	3,101,663	+ 360,462
NET INCOME	1,960,974	2,917,822	— 956,847

Dividends Declared

Bangor & Aroostook.—Common, 87c, quarterly; Preferred, $1.75, quarterly, both payable July 1 to holders of record May 29.

Midland Valley.—Preferred, $1.25, payable June 1 to holders of record May 20.

Missouri-Kansas-Texas.—Preferred A, $1.75, quarterly, payable June 30 to holders of record June 5.

Pennsylvania.—$1.00, quarterly, payable May 29 to holders of record May 1.

Pittsburgh & Lake Erie.—Extra, $5.00, payable May 1 to holders of record April 21.

Providence & Worcester.—2½ per cent quarterly, payable May 31 to holders of record March 11.

Average Prices of Stocks and of Bonds

	Apr. 21	Last week	Last year
Average price of 20 representative railway stocks.	75.84	79.36	132.46
Average price of 20 representative railway bonds..	91.58	91.69	93.41

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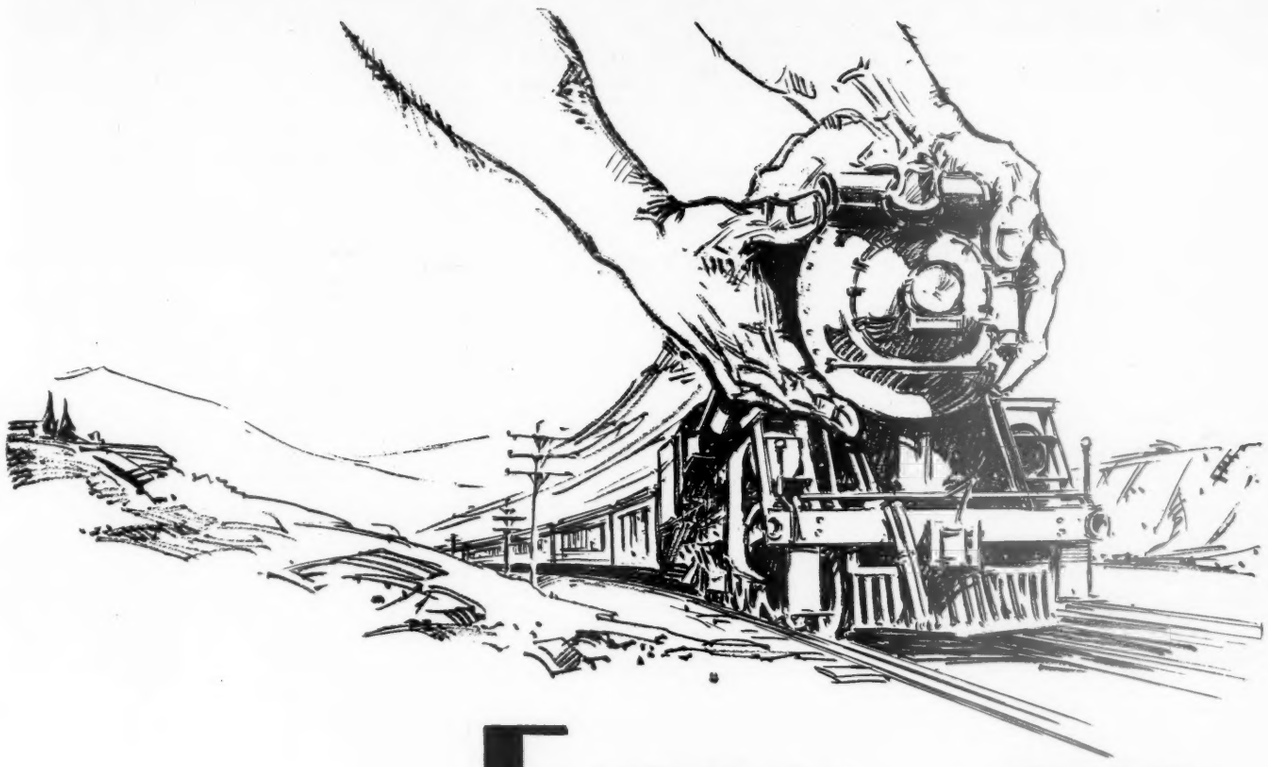

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BETTER FIRES

that are obtained permit the increase of nozzle diameters and the result is increased steaming capacity. Back pressure is reduced. Locomotives have more "pep," consume less fuel and haul more cars.

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Firebar Corporation

Cleveland Ohio

Railway Officers

EXECUTIVE

Elliott White Springs has been appointed president of the Lancaster & Chester, with headquarters at Lancaster, S. C., succeeding his father, **Leroy Springs,** deceased.

Guy E. Stanley, vice-president and general manager of the Woods Brothers Industrial Corporation, Kansas City, Mo., has been appointed executive assistant of the Union Pacific, with headquarters at the same point, effective May 1. Mr. Stanley will represent all departments of the Union Pacific at Kansas City, assisting the several vice-presidents of the railroad on assigned work. He was born in Lincoln county, Kan., on June 21, 1889. Following his graduation from high school at Lincoln Center, Kan., in 1908, he studied law at the Kansas City School of Law, from which

Guy E. Stanley

he graduated in June, 1910. Shortly thereafter he was admitted to the bar in Kansas and began the practice of law in Kansas City, Kan., as a junior member of the firm of Meade & Stanley. In 1911 he became a member of the firm of Stanley & Stanley at Kansas City, Kan., where he remained until September 1, 1925, when he was elected vice-president and general manager of the Woods Brothers Industrial Corporation.

William J. Fripp, assistant vice-president of the New York Central, has been appointed vice-president, lines Buffalo and East, with headquarters at New York, as before. Mr. Fripp was born on August 25, 1863, at Albany, N. Y., and entered railway service on July 17, 1880, serving until January 1, 1885, as a yard clerk on the New York Central & Hudson River (now part of the New York Central), at West Albany, N. Y. From the latter date until February 10, 1888, he was timekeeper on the Mohawk division, and then became clerk on the same division, which position he held until January 23, 1892. He was general dispatcher in the West Albany yard until May 1, 1893, and was then appointed

William J. Fripp

trainmaster of the Mohawk division, which position he held until September 22, 1902. From September 22, 1902, until October 1, 1906, Mr. Fripp was assistant superintendent of the same division, and was then promoted to superintendent of the River division. He became assistant general superintendent of the Boston & Albany (New York Central system) on February 28, 1907, and on April 15 of the same year was promoted to general superintendent of the same road. Mr. Fripp was appointed general superintendent of the Eastern district of the New York Central & Hudson River on February 1, 1910, and assistant general manager of the same road on April 15, 1912. On January 1, 1915, he was appointed general manager at New York, and in January, 1927, was promoted to assistant vice-president, the position he held until his recent promotion.

Rogers Elected President of Elgin, Joliet & Eastern

Scott M. Rogers, vice-president in charge of operation of the Elgin, Joliet & Eastern, was elected president at a meeting of the board of directors on April 15. Mr. Rogers succeeds Alexander F. Banks, who retires on May 1, after serving as president for 30 years. Mr. Rogers' headquarters will remain at Chicago.

Mr. Rogers was born at Newport Pagnall, England, on April 18, 1871, and entered railway service in 1888 as a stenographer and clerk on the Iowa Central (now part of the Minneapolis & St. Louis). Five years later he was advanced to chief clerk to the general manager and in 1894 he was appointed purchasing agent and assistant to the general manager, with headquarters at Marshalltown, Iowa. In 1901 he was appointed chief clerk to the president of the Elgin, Joliet & Eastern, and in the following year he was promoted to purchasing agent. Mr. Rogers has been vice-president in charge of operation of the E., J. & E. since his election to that position in 1909, with the exception of the period during federal control of the railroads when he served as that road's general manager.

Mr. Banks, who is retiring as president at the age of 70 years, in accordance with the rules of the company, was born in Crawford county, Ind., on January 31, 1861. He obtained his first railway experience in 1877 as an office boy for the contracting freight agent of the St. Louis & Southeastern (now part of the Louis-

Scott M. Rogers

ville & Nashville). He then served successively as contracting agent for the St. L. & S. at Evansville, Ind., traveling freight agent and general agent for the Continental Fast Freight Line, general agent for the Iowa Central at Peoria, Ill.,

Alexander F. Banks

and general freight agent and general freight and passenger agent for the latter road. In 1890 he was promoted to traffic manager of the Iowa Central, with headquarters at Marshalltown, where he remained until 1893, when he was appointed traffic manager of the Elgin, Joliet & Eastern, with headquarters at Chicago. Mr. Banks was elected president of the E., J. & E. in 1901.

FINANCIAL, LEGAL AND ACCOUNTING

Edward Beecroft, assistant secretary and assistant treasurer of the Elgin, Joliet & Eastern, has been elected secretary and treasurer, with headquarters as before at Chicago, effective May 1. Mr. Beecroft succeeds **F. L. Koontz,** who

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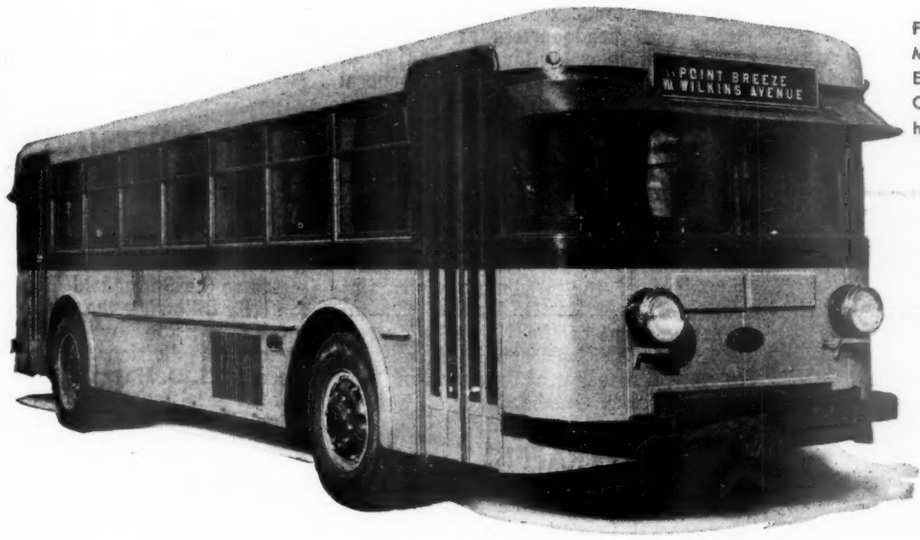
4,000,000



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Pittsburgh is a typical city for motor coach operation. Its choked downtown streets bear heavy traffic, necessitating frequent, quick stops. On broader boulevards in the residential sections, traffic stretches out, speeds up. And Pittsburgh has many hills—stiff ones to go up or down.

The 103 buses of the Pittsburgh Motor Coach Company have established a reputation for swift, comfortable, and dependable passenger service. Last year, this fleet traveled approximately 4,000,000 miles, completing its fourth year on Goodyear tires.

Goodyear Bus Balloons qualify here on superior performance, just as they do in hundreds of other cities and towns—in tight city traffic and on long, fast interstate hauls.

THE GREATEST NAME IN RUBBER

GOODYEAR

ON YOUR NEW COACHES SPECIFY GOODYEARS

will retire as secretary and treasurer on May 1 after serving for 18 years in that position. **W. P. Braker** has been appointed assistant secretary and assistant treasurer, succeeding Mr. Beecroft.

James M. Chaney, who has been promoted to assistant general solicitor of the Missouri Pacific, with headquarters at St. Louis, Mo., has been connected with the legal department of that railroad for 16 years. He was born at Lexington, Mo., on August 10, 1876, and

James M. Chaney

graduated from Westminster College, Fulton, Mo., in 1895. Three years later he completed a legal training at the Kansas City School of Law. In 1898 Mr. Chaney began the practice of law at Kansas City, Mo., where he remained until 1915, when he was appointed assistant attorney in the office of the vice-president and general solicitor of the Missouri Pacific at St. Louis. He was advanced to assistant general attorney and interstate commerce counsel in 1918 and to valuation attorney in 1924, occupying the latter position until his promotion to assistant general solicitor.

OPERATING

W. E. Callahan, who has been connected with the Car Service Division of the American Railway Association at Washington, D. C., has been appointed district manager of that division, with headquarters at Cincinnati, Ohio, succeeding **John A. Morris,** deceased.

Hugh Wilson, superintendent of the Grand Junction division of the Denver & Rio Grande Western, with headquarters at Grand Junction, Colo., has been transferred to the Salt Lake division, with headquarters at Salt Lake City, Utah. **W. R. McPherson,** superintendent of the Salida division, with headquarters at Salida, Colo., has been transferred to the Grand Junction division, replacing Mr. Wilson. The Salida division has been abolished, and the standard gage lines of that division have been assigned to the Grand Junction division, while the narrow gage lines have been assigned to the Alamosa division.

The Chicago, Burlington & Quincy has re-organized general superintendencies on its lines, reducing the number of operating districts from five to three, effective May 1. The Illinois district has been renamed Eastern district, in charge of **C. D. Peckenpaugh,** general superintendent of the Illinois district, with headquarters as before at Galesburg, Ill. The Iowa and Missouri districts have been consolidated as the Central district in charge of **J. D. Farrington,** general superintendent of the Missouri district, with headquarters at St. Louis, Mo., whose new headquarters will be at Burlington, Iowa. **W. A. Card,** general superintendent of the Iowa district at Burlington, has been appointed assistant to general manager of lines east of Missouri river at Chicago. The Wyoming and Nebraska districts have been consolidated as the Western district, with headquarters at Lincoln, Nebr., in charge of **F. G. Gurley,** general superintendent of the Wyoming district at Alliance, Nebr. **L. B. Lyman,** general superintendent of the Nebraska district at Lincoln, has been appointed assistant to general manager of lines west of Missouri River at Omaha, Nebr.

TRAFFIC

J. S. Sikora has been appointed assistant general freight agent of the Delaware, Lackawanna & Western, with headquarters at New York.

J. W. Klein, general freight agent of the Midland Valley, the Kansas, Oklahoma & Gulf and the Oklahoma City-Ada-Atoka, with headquarters at Tulsa, Okla., has been promoted to freight traffic manager in charge of solicitation, with headquarters at Tulsa and Muskogee, Okla.

W. A. Olliff, general freight agent of the Fernwood, Columbia & Gulf, with headquarters at Tylertown, Miss., has entered the service of the Georgia Southwestern & Gulf, assuming the position of general freight and passenger agent, vice **W. M. Carr,** general agent —traffic, deceased. Mr. Olliff's headquarters will be located at Albany, Ga.

C. E. Muller, industrial secretary of the Chamber of Commerce at Jacksonville, Fla., has been appointed freight traffic manager, in charge of solicitation and service, of the Seaboard Air Line with headquarters at Norfolk, Va. This appointment of Mr. Muller, who succeeds **B. C. Prince,** deceased, becomes effective May 1.

Edward Plack, district passenger agent of the Seaboard Air Line at Baltimore, Md., has been promoted to assistant general passenger agent, with headquarters at Washington, D. C. The position of general passenger agent at Washington has been abolished with the resignation of **W. H. Donny,** who served in that capacity. **L. H. Dyer,** city passenger agent at New York, has been promoted to district passenger agent at Baltimore, succeeding Mr. Plack. **J. M. Stuart,** district passenger agent at Buffalo, N. Y., has been promoted to assistant general passenger agent at Philadelphia, Pa., and **R. E. Lamar,** district passenger agent at Philadelphia, has been transferred to Raleigh, N. C., as traveling passenger agent, the position of district passenger agent at Philadelphia having been abolished. **W. J. Ficht,** district passenger agent at St. Petersburg, Fla., has been promoted to district passenger agent at Buffalo, succeeding Mr. Stewart, and **Paul L. Morris,** traveling passenger agent at Sarasota, Fla., has been promoted to district passenger agent at St. Petersburg, Fla., succeeding Mr. Ficht.

ENGINEERING AND SIGNALING

F. W. Armistead, division engineer of the Indiana division of the Illinois Central, at Mattoon, Ill., has been transferred to the Springfield division at Clinton, Ill., following the absorption of the former division by the Illinois and Springfield divisions. Mr. Armistead succeeds **H. C. Hayes,** who has been appointed assistant engineer at Champaign, Ill.

PURCHASES AND STORES

J. C. Glenn has been appointed division storekeeper of the Central of New Jersey and the New York & Long Branch, with headquarters at Elizabethport, N. J., succeeding **C. A. Marshall,** resigned.

OBITUARY

Leroy Springs, president of the Lancaster & Chester since July 1, 1896, died on April 7.

James R. Pratt, president of the Maryland & Delaware Coast, died in Lewes, Del., on April 21, at the age of 67.

Thomas E. Maum, assistant superintendent of the Hartford division of the New York, New Haven & Hartford, died suddenly on April 15.

Edward J. Summers, fuel supervisor of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, died at his home in that city on April 15.

George Cottingham, division engineer of the Illinois division of the Chicago Great Western at Olewein, Iowa, died in that city on April 19.

F. M. Baumgardner, who served as master mechanic on the Illinois Central at Clinton, Ill., from 1912 to 1914, died at his home at Detroit, Mich., on April 16.

Charles T. Schwarz, attorney for the Chicago, Rock Island & Pacific, with headquarters at Chicago, for 40 years, died at his home in that city on April 16 at the age of 67 years, following a prolonged illness.

A. H. Stone, who was assistant engineer on the Kansas City (Mo.) Terminal from 1912 to 1915, during its con-

struction, died at Sanford, Fla., on April 2, where he had been located during the past few years. Prior to his connection with the Kansas City Terminal Mr. Stone served in the engineering department of the Illinois Central.

Benjamin I. Spock, general counsel of the New York, New Haven & Hartford, died in Bermuda on April 21, at the age of 58. Mr. Spock was born in New Haven, Conn., and was educated at Yale University, where he received his B. A. in 1895, and his law degree in 1897. In 1903, he entered the service of the New Haven as claims attorney, and three years later was appointed counsel. In 1914, he was promoted to general solicitor, a position he held until he entered private practice in 1918. Seven years ago he returned to the New Haven as general counsel.

Henry A. Gray, who retired as comptroller of the Northern Pacific, with headquarters at St. Paul, Minn., in 1921, died at Lake Bluff, Ill., on April 20. Mr. Gray had been in railway service for 48 years. He was born in Ireland in 1852 and obtained his first railroad experience in 1873 as a shop clerk on the Chicago & North Western at Chicago. In June, 1875, he was advanced to general bookkeeper at Chicago, where he remained until March, 1881, when he was appointed assistant auditor of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul. He was promoted to auditor of the Omaha in May, 1882, and in January, 1886, he became secretary and treasurer of the Union Steel Company at Chicago. From June, 1889, to February, 1897, Mr. Gray served successively as comptroller, secretary, and secretary and treasurer of the Illinois Steel Company at Chicago. He was then appointed comptroller of the Northern Pacific, a position he held, with the exception of the period during Federal control when he was federal auditor of that road, until his retirement in 1921.

Albert Stone, clerk in the office of the auditor of passenger accounts of the New York Central, New York City, died at his home in Crestwood (Yonkers) N. Y., on April 22, at the age of 95. Mr. Stone, whose ninetieth birthday was noted in the *Railway Age* of October 10, 1925, page 668, was believed to be the oldest active railroad employee in the United States. He was born in New York City on October 8, 1835. When about 13 years old, he was run over by a horse car of the New York & Harlam (now a part of the New York Central) and lost a leg. Two years later the president of the road became interested in him and gave him employment at the terminal passenger station, then at Twenty-sixth street and Fourth Avenue, New York; and he had remained in the employ of the company and its successor ever since.

At the age of 70, Mr. Stone would have been retired on pension, but at his earnest request the company continued him in active service. For the last two years he had done his work at his home instead of going to the office. In October, 1925, fellow employees and officers of the road celebrated his birthday

Albert Stone

with a banquet and other formalities; and in the same year he participated in the celebration of the Fiftieth anniversary of the Young Men's Christian Association at the Grand Central Terminal, of which he had been a member from the beginning.

Annual Reports

Atchison, Topeka & Santa Fe Railway System

Office of The Atchison, Topeka and Santa Fe Railway System, 120 Broadway, New York City.

March 18, 1931.

To the Stockholders:

Your Directors submit the following report for the fiscal year January 1, 1930, to December 31, 1930, inclusive.

Income and Profit and Loss Statement

The following is a summary of the transactions of the System for the years ending December 31, 1929 and 1930:

	1929	1930
Operating revenues	$267,189,178.12*	$226,421,044.94
Operating expenses	175,243,236.62	159,920,622.80
Net operating revenues	$ 91,945,941.50	$ 66,500,422.14
Railway tax accruals	20,340,961.38	18,280,551.52
Uncollectible railway revenues	54,555.91	40,592.67
Equipment and joint facility rents	2,898,093.50	3,302,811.53
Net railway operating income	$ 68,652,330.71	$ 44,876,466.42
Other income	5,827,913.81	5,716,570.03
Gross income	$ 74,480,244.52	$ 50,593,036.45
Miscellaneous tax accruals	80,779.12	62,947.74
Rent for leased roads and other charges	595,783.80	295,973.82
	$ 73,803,681.60	$ 50,234,114.89
Interest on bonds, including accrued interest on adjustment bonds	12,766,878.31	12,885,314.64
Net corporate income (representing amount available for dividends and surplus)	$ 61,036,803.29	$ 37,348,800.25

From the net corporate income for the year the following sums have been deducted:

		1929	1930
Dividends on Preferred Stock—			
No. 64 (2½%) paid August 1, 1930	$3,104,320.00		
No. 65 (2½%) paid February 2, 1931	3,104,320.00	$ 6,208,640.00	
Dividends on Common Stock—			
No. 100 (2½%) paid June 2, 1930	$6,040,732.50		
No. 101 (2½%) paid Sept. 2, 1930	6,040,732.50		
No. 102 (2½%) paid Dec. 1, 1930	6,040,732.50		
No. 103 (2½%) paid March 2, 1931	6,062,077.50		
	$24,184,275.00		
Less accrued dividends received on common stock issued in conversion of Convertible Debenture Bonds	12,514.08	24,171,760.92	
California-Arizona Lines Bonds Sinking Fund		22,043.76	
S. F. & S. J. V. Ry. Co. Bonds Sinking Fund		31,983.94	30,434,428.62
Surplus carried to Profit and Loss			$ 6,914,371.63
Surplus to credit of Profit and Loss, December 31, 1929		$314,460,357.85	
Donations in connection with industry tracks, etc.		195,391.11	
		$314,655,748.96	
Surplus appropriated for investment in physical property—Debit	$195,391.11		
Miscellaneous debits—Net	62,982.18	258,373.29	314,397,375.67
Surplus to credit of Profit and Loss December 31, 1930			$321,311,747.30

* Includes $2,493,193.36 back mail pay.

"Other income" consists of interest accrued and dividends received on securities owned, including United States Government

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securities, interest on bank balances, rents from lease of road and other property, and other miscellaneous receipts.

Comparison of Operating Results

The following is a statement of revenues, and expenses of the System for the year ending December 31, 1930, in comparison with the previous year:

	Year ending Dec. 31, 1930	Year ending Dec. 31, 1929	Increase or *decrease*
OPERATING REVENUES:			
Freight	$175,960,470.98	$204,551,491.70	*$28,591,020.72*
Passenger	31,180,170.25	37,926,205.06	*6,746,034.81*
Mail, express, and miscellaneous	19,280,403.71	24,711,481.36*	*5,431,077.65*
Total operating revenues	$226,421,044.94	$267,189,178.12	*$40,768,133.18*
OPERATING EXPENSES:			
Maintenance of way and structures	$ 35,459,810.19	$ 42,175,626.91	*$ 6,715,816.72*
Maintenance of equipment	45,402,804.05	48,439,076.66	*3,036,272.61*
Traffic	5,964,687.08	5,840,227.06	*124,460.02*
Transportation—Rail line	67,093,802.78	73,011,041.33	*5,917,238.55*
Miscellaneous operations	351,210.29	252,570.42	*98,639.87*
General	6,757,166.13	6,694,388.76	*62,777.37*
Transportation for investment—Cr.	*1,108,857.72*	*1,169,694.52*	*60,836.80*
Total operating expenses	$159,920,622.80	$175,243,236.62	*$15,322,613.82*
Net operating revenue	$ 66,500,422.14	$ 91,945,941.50	*$25,445,519.36*
Railway tax accruals	18,280,551.52	20,340,961.38	*2,060,409.86*
Uncollectible railway revenues	40,592.67	54,555.91	*13,963.24*
Railway operating income	$ 48,179,277.95	$ 71,550,424.21	*$23,371,146.26*
Equipment rents—Net—Dr.	2,504,120.35	2,311,607.65	*192,512.70*
Joint facility rents—Net—Dr.	798,691.18	586,485.85	*212,205.33*
Net railway operating income	$ 44,876,466.42	$ 68,652,330.71	*$23,775,864.29*

Credits in italics. * Includes $2,493,193.36 back mail pay.

The following are averages for 1930 compared with 1929.

The average tons of freight (revenue and company) per loaded car mile decreased from 22.62 to 22.26, or 1.59 per cent.

The average tons of freight (revenue and company) carried per freight-train mile (freight and mixed) decreased from 739.92 to 709.33, or 4.13 per cent.

The average freight revenue per freight-train mile decreased from $8.13 to $7.66, or 5.78 per cent.

The average passenger revenue per passenger-train mile decreased from $1.56 to $1.31, or 16.03 per cent.

The average passenger-train revenue per passenger-train mile decreased from $2.26 to $1.92, or 15.04 per cent.

The tons of revenue and company freight carried one mile decreased 2,313,249,803, or 12.43 per cent, the miles run by loaded and empty freight and work cars in freight and mixed trains decreased 145,792,634, or 11.18 per cent, and the mileage of such trains decreased 2,176,503, or 8.65 per cent.

The number of revenue passengers carried one mile decreased 189,949,392, or 15.31 per cent, the miles run by passenger-train cars (excluding company service) in passenger and mixed trains decreased 9,124,776, or 4.57 per cent, and the mileage of such trains decreased 431,835, or 1.78 per cent.

Taxes

Federal, state, local, and miscellaneous railway tax accruals for the year 1930 aggregate $18,280,551.52, a decrease of $2,060,409.86 compared with the year 1929. A comparison of these accruals for the two years is presented in the following table:

	1930	1929	Increase or *decrease*
FEDERAL TAXES:			
Income	$ 4,469,214.39	$ 6,651,650.56	*$2,182,436.17*
Stamp and license	3,273.11	39,510.76	*36,237.65*
Total	$ 4,472,487.50	$ 6,691,161.32	*$2,218,673.82*
STATE, LOCAL, AND MISCELLANEOUS	13,808,064.02	13,649,800.06	158,263.96
Grand total	$18,280,551.52	$20,340,961.38	*$2,060,409.86*

Credits in italics.

General

Your Company has shared in the vicissitudes which affected business generally during the year 1930. In no other year in its history has there been such a drastic decline in traffic as that which occurred last year. A new high record was established in 1929 and this made the recession in 1930 appear correspondingly greater. Gross earnings were 15.26 per cent below 1929 and 8.57 per cent below 1928. Practically every source of traffic experienced a shrinkage. The drought curtailed crops, although less than in territory further east. Wheat was made before the drought and turned out well, cotton fair, corn from 25 per cent to 50 per cent off, and other crops fair; oil, mining, lumber, building, manufacturing, and industry generally were depressed. It was this combination of unfavorable factors that resulted in so great a diminution of earnings. Because of the widespread drought the railroads put in emergency rates for the movement of feed and live stock to relieve the situation. Under these reduced rates your Company handled a total of 5,164 cars, with a reduction in revenue from regular tariff charges of approximately $250,000.

Relative to prospects for the coming year: Winter wheat in Santa Fe territory has experienced rather more favorable growing conditions than the average, and up to the present has suffered no real damage. The outcome, however, will be determined by conditions as they develop up to harvest time. Citrus fruit promises a larger crop than last year. On the other hand, business generally in our territory is reduced in volume, much as elsewhere, and cannot be expected to increase except in proportion to such general improvement as may take place during the year.

Our normal program of additions and betterments, maintenance and operations was maintained during the early months of the year, in the hope that there might be a recovery during the latter part, but when it became evident that this would not come about retrenchment was made all along the line. While no impairment of condition is being allowed in roadway and structures, nor in equipment, all expenditures not strictly necessary which might, however, be desirable in times of better business have been eliminated and train mileage has been cut to accord with the volume of traffic. In connection with roadway maintenance 552 miles of old rail were replaced with new. Of the new rail 7 miles were 130-lb., 382 miles were 110-lb., and 163 miles were 90-lb. Since the adoption of 110-lb. rail as standard for our transcontinental main lines 3,013 miles of this weight have been laid, and in addition 14 miles of 130-lb. rail. A reasonable program of additions and betterments is also being carried on. New equipment has been ordered to take care of all necessary replacement during the year.

In 1920 your Company carried 15,656,333 passengers, an average distance of 139.83 miles each; in 1930, 3,274,826 passengers 320.79 miles each. Private automobiles largely and busses to a less degree, have taken away the great part of the short haul passenger business and a substantial amount of long haul. In order to meet these conditions your Company has now in operation 32 gas-electric motors in lieu of local passenger trains and will substitute 14 more during this year. These give very satisfactory service and save in expense.

The situation with respect to trucks and pipe lines, which are very serious competitors in freight transport, is quite menacing. We feel that thus far the truck competition has not been on a strictly economic basis. Trucks are not generally required to pay their full share of the upkeep of the highways and are seldom, if ever, required to compensate the public for their use of the highways as a place upon which to conduct a business for profit. Truck rates are made at times to get business without due regard to costs. Truck owners have not been governed in size of trucks by public convenience, nor in weight by the designed strength of the highways. We hope that in time these operations will reach a strictly economic basis and the railroads will then know better where they stand. Relative to pipe lines: Where the volume of oil is enough to justify a pipe line, a railroad cannot compete successfully. Crude oil has been largely handled by pipe lines for years. It is now proposed to send refined oils through them, but it is not known how much this field will be developed.

There is a disposition on the part of the Government to provide inland waterways and carriers thereon, although every study shows that the cost of this transportation, if all expenditures are included, is greater than by rail. The railroads are, however, not only compelled by law to put in joint through rates in order to feed the water carriers, but also the water carriers contend that the rail carriers should receive less in the division of these joint through rates than they would receive out of joint through all rail rates via the same points of interchange, notwithstanding the fact that by reason of these joint rates with the water carriers the railroads are deprived of traffic which they originate and otherwise would handle to destination.

During the year 1930 your Company paid out in pensions to its retired employes $692,214.79, there being 1,412 pensioners on the roll at December 31, 1930, compared with $599,479.69 paid in 1929 and 1,248 pensioners December 31, 1929. The pensioners have an average service of 30 years with the Company and an average age of 67 years. During 1930 death benefits were paid in 433 cases, amounting to $514,377.88, compared with $455,779.68 in 412 cases in 1929. The average length of service in all cases in which death benefits were paid in 1930 was 19 years, while in 1929 it was 17 years.

Your Directors acknowledge with pleasure the faithful and efficient service rendered by the officers and employes of the Company.

W. B. STOREY,
President.

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Union Pacific Railroad Company—Thirty-Fourth Annual Report—Year Ended December 31, 1930

NEW YORK, N. Y., April 7, 1931.

TO THE STOCKHOLDERS OF UNION PACIFIC RAILROAD COMPANY:

The Board of Directors submits the following report of the operations and affairs of the Union Pacific Railroad Company for the calendar year ended December 31, 1930, *including* the Oregon Short Line Railroad Company, whose entire capital stock is owned by the Union Pacific Railroad Company, the Oregon-Washington Railroad & Navigation Company, whose entire capital stock (except fifteen qualifying shares held by Directors) is owned by the Oregon Short Line Railroad Company, and the Los Angeles & Salt Lake Railroad Company, whose entire capital stock is owned, one half each, by the Union Pacific Railroad Company and the Oregon Short Line Railroad Company. For convenience, the four companies are designated by the term "UNION PACIFIC SYSTEM."

Income

The operated mileage at close of year and income for the calendar year 1930, compared with 1929, *after excluding all offsetting accounts between the Union Pacific Railroad Co., Oregon Short Line Railroad Co., Oregon-Washington Railroad & Navigation Co., and Los Angeles & Salt Lake Railroad Co.*, were as follows:

	Calendar Year 1930	Calendar Year 1929	INCREASE	DECREASE
Operated Mileage at Close of Year				
Miles of road	9,841.08	9,878.21	.....	37.13
Miles of additional main track	1,559.50	1,554.67	4.83	
Miles of yard tracks and sidings	4,090.18	4,054.78	35.40	
Total Mileage Operated	15,490.76	15,487.66	3.10	
Transportation Operations				
Operating revenues	$189,672,612.04	$217,356,592.76	.....	$27,683,980.72
Operating expenses	131,154,849.68	147,026,561.37	.....	15,871,711.69
Revenues over expenses	$58,517,762.36	$70,330,031.39	.....	$11,812,269.03
Taxes	15,041,887.42	17,089,568.34	.....	2,047,680.92
Uncollectible railway revenues	7,862.69	13,952.59	.....	6,089.90
Railway Operating Income	$43,468,012.25	$53,226,510.46	.....	$9,758,498.21
Rents from use of joint tracks, yards, and terminal facilities	1,748,789.17	1,452,821.57	$295,967.60	.....
	$45,216,801.42	$54,679,332.03	.....	$9,462,530.61
Hire of equipment—debit balance	$7,593,045.52	$6,974,463.90	$618,581.62	.....
Rents for use of joint tracks, yards, and terminal facilities	2,326,033.83	2,379,299.67	.....	$53,265.84
	$9,919,079.35	$9,353,763.57	$565,315.78	
Net Income from Transportation Operations	**$35,297,722.07**	**$45,325,568.46**	.....	**$10,027,846.39**
Income from Investments and Sources other than Transportation Operations.				
Dividends on stocks owned	$12,579,740.61	$11,597,524.46	$982,216.15	
Interest on bonds, notes, and equipment trust certificates owned	6,042,382.24	6,496,949.38	.....	$454,567.14
Interest on loans and open accounts—balance	296,576.56	2,471,725.15	.....	2,175,148.59
Rents from lease of road	120,275.34	120,704.09	.....	428.75
Miscellaneous rents	613,393.81	625,011.07	.....	11,617.26
Miscellaneous income	185,384.63	286,558.61	.....	101,173.98
Total	$19,837,753.19	$21,598,472.76	.....	$1,760,719.57
Total Income	$55,135,475.26	$66,924,041.22	.....	$11,788,565.96
Fixed and Other Charges				
Interest on funded debt	$15,260,713.15	$17,035,128.53	.....	$1,774,415.38
Miscellaneous rents	7,678.98	25,298.42	.....	17,619.44
Miscellaneous charges	1,131,077.53	607,571.42	$523,506.11	.....
Total	$16,399,469.66	$17,667,998.37	.....	$1,268,528.71
Net Income from All Sources	**$38 736,005.60**	**$49,256,042.85**	.....	**$10 520,037.25**

DISPOSITION OF NET INCOME

Dividends on Stock of Union Pacific Railroad Co.:				
Preferred stock:				
2 per cent paid April 1, 1930	$1,990,862.00			
2 per cent paid October 1, 1930	1,990,862.00	$3,981,724.00	$3,981,724.00	
Common stock:				
2½ per cent paid April 1, 1930	$5,557,290.00			
2½ per cent paid July 1, 1930	5,557,290.00			
2½ per cent paid October 1, 1930	5,557,290.00			
2½ per cent payable January 2, 1931	5,557,290.00	22,229,160.00	22,229,160.00	
Total Dividends		$26,210,884.00	$26,210,884.00	
Sinking Fund Requirements		.....	10,000.00	..... $10,000.00
Total Appropriations of Net Income		$26,210,884.00	$26,220,884.00	..... $10,000.00
Surplus, Transferred to Profit and Loss		**$12,525,121.60**	**$23,035,158.85**	..... $10,510,037.25

The decrease of $20,084,748.98 or 11.7% in "Freight Revenue" was due to a decrease of 10.9 per cent in net ton-miles of revenue freight carried and a decrease of .7 per cent in average revenue per ton-mile occasioned principally by fluctuations in the kinds of commodities handled. Reduced production by lumber mills in the Pacific Northwest caused a large decrease in the transportation of forest products. Shipments of manufacturers and miscellaneous commodities decreased substantially, particularly (*1*) iron and steel pipe, because of less construction of natural gas pipe lines in System territory, (*2*) machinery and boilers and other iron and steel products, attributable to curtailed industrial activities, (*3*) automobiles and parts, because of decreased production, (*4*) radios, washing machines, refrigerators, etc., due to generally unfavorable business conditions, and (*5*) silk, because of smaller imports. Lead, zinc and copper moved in less volume from smelters in Utah, Idaho and Montana because of depressed metal market. Completion early in the year of pleasure pier at Long Beach, California, resulted in a smaller movement of stone; and mild weather, reduced industrial requirements and increased competition of natural gas caused a substantial decrease in the transportation of coal. There was a decrease in shipments of canned food products, principally because of smaller pack of fruits and fish in California and less demand for canned salmon from the North Pacific Coast. The movement of citrus fruits decreased on account of the small orange crop in California; but better

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General Balance Sheet—Assets

(Excluding all offsetting securities and accounts between the Union Pacific Railroad Co., Oregon Short Line Railroad Co., Oregon-Washington Railroad & Navigation Co. and Los Angeles & Salt Lake Railroad Co.)

		December 31, 1930	December 31, 1929	Increase	Decrease
Investments:					
	Road and Equipment	$920,613,595.19	$909,873,259.09	$10,740,336.10	
	Less:				
	Receipts from improvement and equipment fund	$23,823,091.13	$23,823,091.13		
	Appropriations from income and surplus prior to July 1, 1907, credited to this account	13,310,236.52	13,310,236.52		
	Total	$37,133,327.65	$37,113,327.65		
701.	**Investment in road and equipment**	**$883,480,267.54**	**$872,739,931.44**	**$10,740,336.10**	
704.	Deposits in lieu of mortgaged property sold	$358,320.17	$255,634.49	$102,685.68	
705.	Miscellaneous physical property	2,416,296.47	2,376,800.13	39,496.34	
	Total	$2,774,616.64	$2,632,434.62	$142,182.02	
706.	**Investments in affiliated companies:**				
	Stocks	$22,325,141.53	$21,853,592.46	$471,549.07	
	Bonds, notes, and equipment trust certificates	21,691,522.13	24,535,064.50	.....	$2,843,542.37
	Advances	21,932,117.40	20,194,845.61	1,737,271.79	
	Total	$65,948,781.06	$66,583,502.57	.....	$634,721.51
707.	**Investments in other companies:**				
	Stocks	$95,840,417.27	$93,932,217.27	$1,908,200.00	
	Bonds, notes, and equipment trust certificates	71,868,252.26	76,213,897.06	.....	$ 4,345,644.80
	Total	$167,708,669.53	$170,146,114.33	.....	$2,437,444.80
	United States Government Bonds and Notes	$34,652,736.56	$32,013,361.56	$2,639,375.00	
703.	Sinking funds	$173,932.08	$156,797.93	$17,134.15	
	Total Investments	**$1,154,739,003.41**	**$1,144,272,142.45**	**$10,466,860.96**	
Current Assets:					
708.	Cash	$18,485,167.46	$9,313,776.85	$9,171,390.61	
709.	Demand Loans and Deposits	1,500,000.00	6,500,000.00	.....	$5,000,000.00
710.	Time Drafts and Deposits	.....	50,000.00	.....	50,000.00
711.	Special deposits	127,074.53	81,678.41	45,396.12	
712.	Loans and bills receivable	5,702.11	9,285.92	.....	3,583.81
713.	Traffic and car service balances receivable	3,986,590.47	4,120,597.18	.....	134,006.71
714.	Net balance receivable from agents and conductors	986,471.46	1,125,724.24	.....	139,252.78
715.	Miscellaneous accounts receivable	3,973,319.42	4,637,685.18	.....	664,365.76
716.	Material and supplies	16,962,371.08	17,963,837.11	.....	1,001,466.03
717.	Interest and dividends receivable	1,645,880.87	1,752,392.62	.....	106,511.75
718.	Rents receivable	186,535.73	178,758.63	7,777.10	
719.	Other current assets:				
	Baltimore and Ohio Railroad Co. capital stock applicable to payment of extra dividend of 1914	121,398.20	125,058.20	.....	3,660.00
	Miscellaneous items	112,860.46	99,233.29	13,627.17	
	Total Current Assets	$48,093,371.79	$45,958,027.63	$2,135,344.16	
Deferred Assets:					
720.	Working fund advances	$89,586.90	$101,836.70	.....	$12,249.80
722.	Other deferred assets:				
	Land contracts, as *per contra*	10,206.49	14,257.93	.....	4,051.44
	Miscellaneous items	2,613,419.71	2,978,317.57	.....	364,897.86
	Total Deferred Assets	$2,713,213.10	$3,094,412.20	.....	$381,199.19
Unadjusted Debits:					
723.	Rents and insurance premiums paid in advance	$3,543.90	$4,742.92	.....	$1,199.02
725.	Discount on funded debt	953,462.84	985,156.88	.....	31,694.04
727.	Other unadjusted debits	1,540,525.91	1,373,431.71	$167,094.20	
	Total Unadjusted Debits	$2,497,532.65	$2,363,331.51	$134,201.14	
	Grand Total	**$1,208,043,120.95**	**$1,195,687,913.79**	**$12,355,207.16**	

crops of deciduous fruits and vegetables in Pacific Coast and intermountain territory resulted in a substantial increase in the transportation of these commodities. The wheat crop was larger in Kansas, Nebraska and Colorado and the movement increased substantially. There was also an increase in the transportation of refined petroleum oils, particularly gasoline, because of favorable weather conditions and additional improved highways in System territory permitting greater use of automobiles.

The decrease of $5,146,523.41 or 19.6% in "Passenger Revenue" was due to a decrease of 17.5 per cent in revenue passengers carried one mile, occasioned principally by a decrease in general travel on regular trains and in summer travel to National Parks and by the continued diversion of business to motor vehicles; and to a decrease of 2.3 per cent in average revenue per passenger mile.

The decrease of $731,436.01 or 16.4% in "Express Revenue" was due principally to decrease in movement of less than carload traffic.

The decrease of $375,890.55 or 9.7% in "Other Passenger-Train Revenue" was due principally to a decrease in dining and buffet revenue because of the decline in passenger traffic.

The decrease of $134,285.22 or 10.3% in "Switching Revenue" was due to the decreased volume of freight traffic handled.

The decrease of $1,018,843.40 or 24.1% in "Other Revenue" was principally in receipts from hotel and restaurant operations, due chiefly to the decrease in passenger traffic, and in receipts from company boarding outfits operated for the benefit of construction forces at isolated locations, because of less construction work at such locations.

The decrease of $5,328,661.85 or 18.9% in "Maintenance of Way and Structures Expenses" was due to the smaller volume of traffic moved and very favorable weather conditions throughout the year permitting the handling of maintenance work at minimum expense; to economies in the use of labor and material and greater use of power machines; and to less improvement work involving heavy retirements and other charges to Maintenance Expenses. Way and structures were well maintained.

The principal track materials used during the year in making renewals were as follows:

New steel rails	254.59	track miles
Second-hand steel rails	23.83	" "
Total	278.42	track miles

excluding yard tracks and sidings, equivalent to 2.7 per cent of the track miles in main track at the beginning of the year. Ties 1,919,204 (98.4 per cent treated), equivalent to 4.9 per cent of all ties in track at the beginning of the year. Tie plates 1,442,862 and continuous rail joints 125,892.

The decrease of $3,734,250.09 or 9.8% in "Maintenance of Equipment Expenses" was principally in repairs to locomotives and freight cars, because of less use. Locomotive miles decreased 8.4 per cent and freight-car miles 6.1 per cent. Equipment was maintained in good condition.

The decrease of $178,932.28 or 3.6% in "Traffic Expenses" was chiefly in expenditures for advertising, stationery and printing, and outside agencies.

The decrease of $5,070,458.53 or 8.1% in "Transportation Expenses—Rail Line" was due principally to the decrease in volume of freight business handled. There were decreases of 7.1 per cent in freight gross ton-miles and 9.4 per cent in

[Advertisement]

General Balance Sheet—Liabilities

(Excluding all offsetting securities and accounts between the Union Pacific Railroad Co., Oregon Short Line Railroad Co., Oregon-Washington Railroad & Navigation Co., and Los Angeles & Salt Lake Railroad Co.)

		December 31, 1930	December 31, 1929	Increase	Decrease
751.	**Capital Stock**				
	Common Stock	$222,293,100.00	$222,293,100.00		
	Preferred stock	99,543,100.00	99,543,100.00		
	Total Capital Stock	$321,836,200.00	$321,836,200.00		
755.	**Funded Debt**	359,884,870.00	362,116,420.00	.....	$2,231,550.00
	Total	$681,721,070.00	$683,952,620.00	.....	$2,231,550.00
754.	**Grants in Aid of Construction**	$910,895.36	$831,067.98	† $79,827.38	
	Current Liabilities:				
759.	Traffic and car service balances payable	$1,845,382.54	$1,600,025.53	$245,357.01	
760.	Audited accounts and wages payable	9,093,855.02	10,548,468.97	.....	$1,454,613.95
761.	Miscellaneous Accounts Payable:				
	Due to affiliated companies	22,209,288.47	20,534,409.14	1,674,879.33	
	Other accounts payable	211,500.51	206,916.90	4,583.61	
762.	Interest matured unpaid:				
	Coupons matured, but not presented	101,271.44	118,070.24	.....	16,798.80
	Coupons and interest on registered bonds, due first proximo	4,516,582.20	4,516,523.10	59.10	
763.	Dividends matured unpaid:				
	Dividends due but uncalled for	130,322.50	127,716.50	2,606.00	
	Extra dividend on common stock declared January 8, 1914, payable to stockholders of record March 2, 1914, unpaid	130,730.94	134,902.30	.....	4,171.36
	Dividend on common stock payable second proximo	5,557,290.00	5,557,290.00		
764.	Funded debt matured unpaid	56,325.00	580,325.00	.....	524,000.00
766.	Unmatured interest accrued	1,527,678.13	1,552,020.44	.....	24,342.31
767.	Unmatured rents accrued	622,050.92	635,403.56	.....	13,352.64
768.	Other current liabilities	74,367.23	148,641.23	.....	74,274.00
	Total Current Liabilities	$46,076,644.90	$46,260,712.91	.....	$184,068.01
	Deferred Liabilities:				
770.	Other deferred liabilities:				
	Principal of deferred payments on land contracts, as *per contra*	$10,206.49	$14,257.93	.....	$4,051.44
	Contracts for purchase of real estate	1,660,000.00	1,660,000.00		
	Miscellaneous items	8,253,925.05	8,191,886.58	$62,038.47	
771.	Tax liability	9,129,755.09	11,075,936.52	.....	1,946,181.43
	Total Deferred Liabilities	$19,053,886.63	$20,942,081.03	.....	$1,888,194.40
	Unadjusted Credits:				
773.	Insurance reserve:				
	Reserve for fire insurance	$4,318,799.21	$3,679,494.92	$639,304.29	
776.	Reserve for depreciation	79,823,457.73	74,524,804.59	5,298,653.14	
778.	Other unadjusted credits:				
	Contingent interest	703,313.09	678,369.09	24,944.00	
	Miscellaneous items	1,351,392.18	2,555,822.95	.....	$1,204,430.77
	Total Unadjusted Credits	$86,196,962.21	$81,438,491.55	$4,758,470.66	
	Total Liabilities	**$833,959,459.10**	**$833,424,973.47**	**$534,485.63**	
	Surplus:				
	Appropriated for additions and betterments	$30,474,626.71	$30,425,460.90	† $49,165.81	
	Reserved for depreciation of securities	34,972,570.88	34,972,570.88		
	Funded debt retired through income and surplus	536,828.66	536,828.66		
	Sinking fund reserves	177,606.00	170,126.22	7,479.78	
	Total Appropriated Surplus	$66,161,632.25	$66,104,986.66	$56,645.59	
784.	**Profit and Loss—Credit Balance**	**276,249,135.38**	**264,485,059.44**	**11,764,075.94**	
	Total Surplus	$342,410,767.63	$330,590,946.10	$11,820,721.53	
	As this consolidated balance sheet excludes all intercompany items, securities of the Los Angeles & Salt Lake Railroad Company owned by other System companies are not included. The difference between the par and face value of such securities as carried on the books of the Los Angeles & Salt Lake (less unextinguished discount on the bonds and discount charged to Profit and Loss but added back in consolidating the accounts) and the amounts at which the securities are carried on the books of the owning System companies is set up here to balance	$31,672,894.22	$31,672,894.22		
	Grand Total	**$1,208,043,120.95**	**$1,195,687,913.79**	**$12,355,207.16**	

† These amounts respectively represent donations made during the year by Federal Government, States, counties and municipalities and by individuals and companies in part payment for improvements, such as road crossings, drainage projects, and industry spur tracks, the cost of which was charged to "Investment in Road and Equipment." These amounts are so accounted for to conform with regulations of the Interstate Commerce Commission.

freight-train miles. There was also a decrease of 3.9 per cent in passenger-train and motor-car miles with a consequent reduction in expenses, due to the discontinuance of a number of main line local and branch line passenger trains during the year. There has been a continuing decrease in passenger business since 1923, but until this year it has been difficult to get authority from the various regulatory bodies to discontinue unprofitable passenger trains.

The decrease of $1,092,419.82 or 24.1% in "Miscellaneous Operations Expenses" was principally in dining car, hotel, restaurant and boarding outfit operations. (See explanations of decreases in Other Passenger-Train Revenue and Other Revenue.)

The decrease of $446,086.94 or 5.3% in "General Expenses" was due principally to decreases in clerical forces, premiums on employes' group insurance and expenditures for stationery and printing.

An analysis by classes of the decrease of $2,047,680.92 or 12% in "Taxes" is shown in the table. The decrease in State and county taxes resulted principally from decreases in several States in both assessments and tax levies. The decrease in Federal income and other Federal taxes was due principally to a decrease in taxable income and profits, partially offset by an increase in the income tax rate from 11 to 12 per cent.

The increase of $618,581.62 or 8.9% in "Equipment Rents (Debit)" was due chiefly to an increase in mileage payments on refrigerator cars, there having been a substantial increase in number of carloads of perishable commodities handled.

The decrease of $349,233.44 or 37.7% in "Joint Facility Rents (Debit)" was due chiefly to an accounting adjustment.

The *increase* in **"Investment in Road and Equipment"** is made up as follows:

Extensions and Branches		$498,220.73
Additions and Betterments, *excluding Equipment*		8,746,447.69
Equipment		4,820,964.87
Total Increase		$14,065,633.29
From which there was deducted:		
Cost of property retired from service and not to be replaced	$1,168,437.12	
Cost of real estate retired	43,948.69	
Cost of equipment retired from service	2,112,911.38	
Total Deductions		3,325,297.19
Net increase in "Investment in Road and Equipment"		**$10,740,336.10**

Branch line extending 22.71 miles in a general easterly direction from a connection with the main line at a point about 7.17 miles south of Las Vegas, Nevada, to provide for the

[Advertisement]

Operating Results for Year 1930 Compared with Year 1929

	Calendar Year 1930	Calendar Year 1929	Increase	Decrease	Per Cent
Average Miles of road operated	9,868.93	9,869.40	.....	.47	—
Operating Revenues					
1. Freight revenue	$151,661,002.09	$171,745,751.07	.....	$20,084,748.98	11.7
2. Passenger revenue	21,177,194.59	26,323,718.00	.....	5,146,523.41	19.6
3. Mail revenue	5,100,357.38	5,232,626.30	.....	132,268.92	2.5
4. Express revenue	3,732,807.36	4,464,243.37	.....	731,436.01	16.4
5. Other passenger-train revenue	3,498,129.77	3,874,020.32	.....	375,890.55	9.7
6. Other train revenue	50,295.60	101,721.96	.....	51,426.36	50.6
7. Switching revenue	1,171,739.26	1,306,024.48	.....	134,285.22	10.3
8. Water line revenue	63,832.56	72,390.43	.....	8,557.87	11.8
9. Other revenue	3,217,253.43	4,236,096.83	.....	1,018,843.40	24.1
10. Total operating revenues	$189,672,612.04	$217,356,592.76	.....	$27,683,980.72	12.7
11. Maintenance of way and structures	$22,917,347.76	$28,246,009.61	.....	$5,328,661.85	18.9
12. Maintenance of equipment	34,548,850.41	38,283,100.50	.....	3,734,250.09	9.8
13. Total maintenance expenses	$57,466,198.17	$66,529,110.11	.....	$9,062,911.94	13.6
14. Traffic expenses	4,730,408.82	4,909,341.10	.....	178,932.28	3.6
15. Transportation expenses—rail line	57,567,892.33	62,638,350.86	.....	5,070,458.53	8.1
16. Transportation expenses—water line	45,534.03	56,453.22	.....	10,919.19	19.3
17. Miscellaneous operations expenses	3,439,242.13	4,531,661.95	.....	1,092,419.82	24.1
18. General expenses	7,916,741.99	8,362,828.93	.....	446,086.94	5.3
19. Transportation for investment—*Credit*	11,167.79	1,184.80	$9,982.99	.....	—
20. Total operating expenses	$131,154,849.68	$147,026,561.37	.....	$15,871,711.69	10.8
21. Revenues over expenses	$58,517,762.36	$70,330,031.39	.....	$11,812,269.03	16.8
Taxes					
22. State and county	$11,853,944.60	$11,988,300.23	.....	$134,355.63	1.1
23. Federal income and other federal	3,187,942.82	5,101,268.11	.....	1,913,325.29	37.5
24. Total taxes	$15,041,887.42	$17,089,568.34	.....	$2,047,680.92	12.0
25. Uncollectible railway revenues	$7,862.69	$13,952.59	.....	$6,089.90	43.6
26. Railway operating income	$43,468,012.25	$53,226,510.46	.....	$9,758,498.21	18.3
27. Equipment rents (debit)	7,593,045.52	6,974,463.90	$618,581.62	.....	8.9
28. Joint facility rents (debit)	577,244.66	926,478.10	.....	349,233.44	37.7
29. Net railway operating income	$35,297,722.07	$45,325,568.46	.....	$10,027,846.39	22.1
Per cent—Operating expenses of operating revenues	69.15	67.64	1.51	.....	2.2
Freight Traffic. *(Commercial Freight only)*					
Tons of revenue freight carried	31,844,462	36,250,018	.....	4,405,556	12.2
Ton-miles, revenue freight	12,858,923,108	14,430,923,565	.....	1,572,000,457	10.9
Average distance hauled per ton *(miles)*	403.80	398.09	5.71	.....	1.4
Average revenue per ton-mile *(cents)*	1.164	1.172	.....	.008	.7
Average revenue per freight-train mile	$7.29	$7.47	.....	$.18	2.4
Passenger Traffic *(Excluding Motor Car)*					
Revenue passengers carried	2,270,235	3,021,329	.....	751,094	24.9
Revenue passengers carried one mile	738,178,548	894,452,892	.....	156,274,344	17.5
Average distance hauled per passenger *(miles)*	325.16	296.05	29.11	.....	9.8
Average passengers per passenger-train mile	41.34	47.76	.....	6.42	13.4
Average revenue per passenger-mile *(cents)*	2.828	2.895	.....	.067	2.3
Average revenue per passenger-train mile, passengers only	$1.17	$1.38	.....	$.21	15.2
Average total revenue per passenger-train mile	$1.84	$2.09	.....	$.25	12.0

transportation of men and materials necessary for the construction by the United States Government of the Hoover Dam (formerly called Boulder Dam) at Black Canyon on the Colorado River, was completed and placed in operation on February 5, 1931.

In the report for the year 1929, it was stated that the Oregon-Washington Railroad & Navigation Company and Northern Pacific Railway Company would early in 1930 commence the construction of a line, to be jointly owned and operated, to extend approximately 67 miles northerly from a point near Moclips, Washington, into the Olympic Peninsula, to serve an undeveloped territory containing a large amount of timber and some other resources. Due to the general depression in the lumber industry, the construction of this line has been deferred. During the year 1930 changes in survey were made which will shorten the line approximately 10 miles.

[Advertisement]

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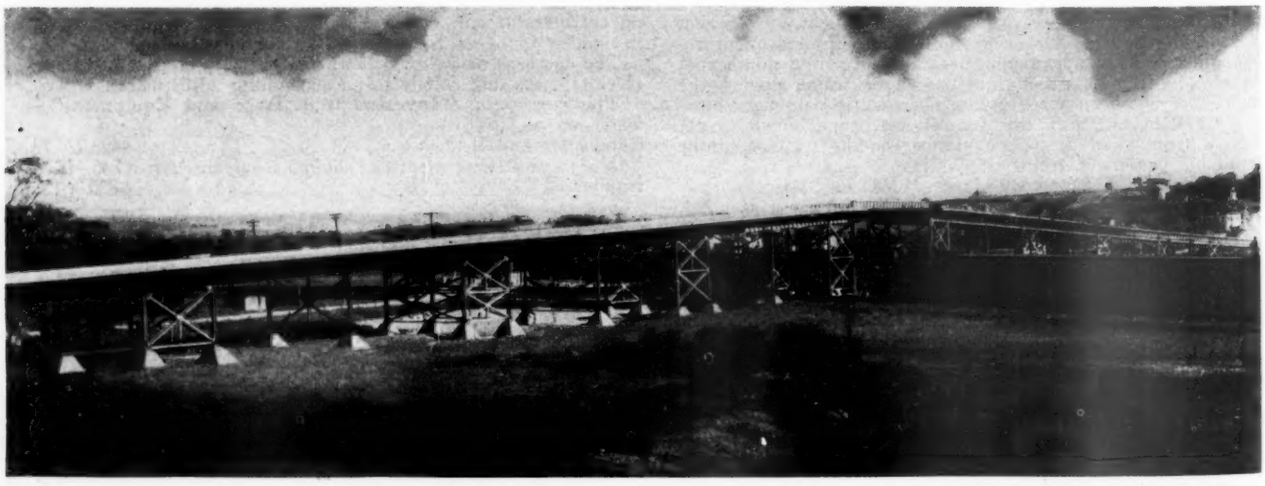


A 2,800-ft. Viaduct Built in 1930 for the New York Central at Syracuse, N. Y., by the Bates & Rogers Construction Company

Chicago, Milwaukee, St. Paul and Pacific Railroad Company—Third Annual Report, for the Year Ended December 31, 1930

To the Stockholders of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company:

The Board of Directors submits the following report of the operations and affairs of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company for the year ended December 31, 1930:

The world-wide industrial depression, the effects of which were first felt in this country in the fall of 1929, and which continued throughout the entire year 1930 with increasing severity, reduced sharply the volume of business and revenues of your company in common with other railroads and industries.

Total railway operating revenues were reduced from $171,361,385 in 1929 to $142,569,632 in 1930 or 16.8%.

Total freight revenue decreased from $137,176,431 in 1929 to $115,638,093 in 1930 or 15.7%, and was the lowest for any year since 1921. Revenue per ton of revenue freight was $2.65 in 1930 as compared with $2.64 in 1929, and the average revenue per ton-mile in 1930 was 10.59 mills as against 10.48 mills in 1929. The average distance haul of freight in the year 1930 was 250 miles as compared with 252 miles in 1929.

Passenger revenue continued to decline, due to the business depression and continued inroads on railroad passenger traffic by motor vehicles. Passenger revenue for the year 1930 was $12,681,684 compared with $16,753,297 in 1929, or a decrease of $4,071,613 or 24.3%. Total passenger service train revenue decreased from $27,351,398 in 1929 to $21,207,785 in 1930 or 22.5%. Passenger train miles decreased from 16,219,840 in 1929 to 15,407,492 in 1930 or 5.0%.

Net railway operating income for 1930 was $15,954,548, a reduction of $10,319,775 from 1929 or 39.28%.

Net income before interest on funded debt for 1930 was $17,901,207, a reduction of $11,174,861 from 1929 or 38.43%.

To meet this heavy shrinkage in revenues, every effort was made to improve operating efficiency and to reduce costs where it could be done without affecting materially the physical condition of the property.

Maintenance of Way and Structure expenses were reduced $5,531,621 or 19.8%; Maintenance of Equipment expenses, $2,955,312 or 9.5%, and Transportation expenses, $7,347,439 or 12.2%. These reductions were made possible partly by more efficient operation and partly by the reduction in volume of business, in the latter case more so in Maintenance of Equipment and Transportation expenses than in Maintenance of Way and Structure expenses, where about two-thirds of the expenditures are due to causes other than volume of business.

The total railway operating expenses for the year 1930 were $112,295,805 as compared with $128,800,861 for 1929, a reduction of $16,505,056 or 12.8%.

A very creditable showing was made in the reduction of equipment rents in 1930: payments on railroad-owned equipment in 1929 of $710,925 and private car mileage of $3,284,384 or a total of $3,995,309 were reduced in 1930 to $2,064,100 or a total reduction of $1,931,209 or 48.3%.

The maintenance reductions made have not affected the physical condition of the property, but it should be understood that such reductions could not be continued indefinitely without doing so.

In a number of items where the falling off in business did not control, improved operating performance was effected during the year as, for example: pounds of coal consumed per locomotive mile in freight service decreased 4.4%; freight train costs per average train mile, including all operating expenses, decreased 2.6%; passenger train costs per average train mile, including all operating expenses, decreased 5.1%, and the average gross ton miles per freight train hour increased 3.6%.

It has already been stated that railway operating revenues decreased in 1930 as compared with 1929, 16.8%, and that operating expenses were reduced 12.8%. A railroad being subject to State and Interstate Commerce regulation and required to afford a certain minimum service to the public is not able to make reductions proportionate to the loss in business as are other industries not so subjected and the nature of whose operations more readily permits adjustments of production to consumption.

The officers of your company have endeavored in the past to work out co-operative arrangements with other companies for the purpose of eliminating unnecessary competition and expense, particularly in the matter of passenger train service. Efforts in this direction are being continued.

Income

As already stated, the net income of the Company, before deducting interest on funded debt, for the year 1930 was $17,901,207, a reduction of $11,174,861 or 38.43% which is explained as follows:

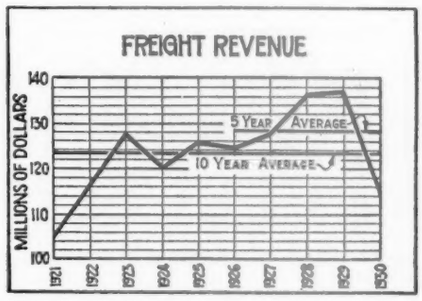
Decrease in net of operating revenues and expenses as discussed above		$12,286,698
Decrease in interest received		801,190
Net decrease in rents and other non-operating income		65,644
Total		$13,153,532
Less—		
Decreased charges for equipment and joint facility rents	$1,825,651	
Decrease charges for tax accruals and uncollectible railway revenue	141,272	
Decrease in other deductions	11,748	1,978,671
Net decrease		$11,174,861

Interest on fixed interest bearing obligations for the year 1930 was $13,642,932. After deducting this interest there was left $4,258,275. Interest charges at 5% on Convertible Adjustment Bonds which became cumulative January 1, 1930, were $9,143,685, which left a deficit for the year of $4,885,410, compared with a net income of $7,074,014 in 1929 or a decrease of $11,959,424. The difference between this amount and the $11,174,861 stated above is due to an increase in interest on fixed interest bearing obligations in the amount of $784,563.

Railway Operating Revenues

Railway operating revenues and freight revenue for 1930 in comparison with 1929 have been discussed.

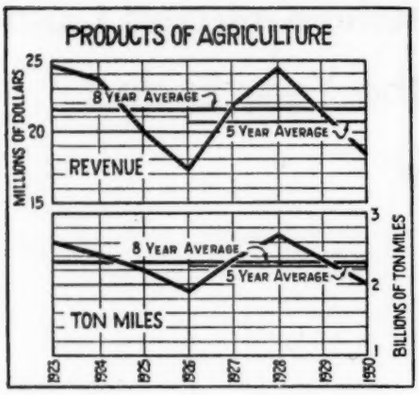
The accompanying chart illustrates the trend of freight traffic during the ten years ended December 31, 1930. In this period the yearly average of freight revenue was $123,584,635, and in the past five years the average was $128,250,082.

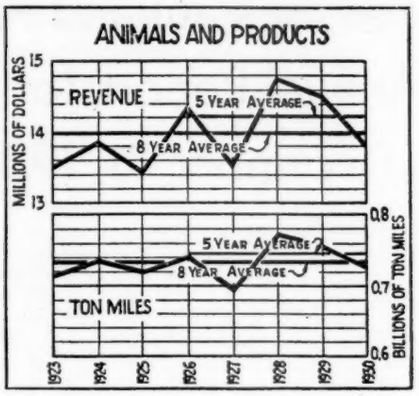


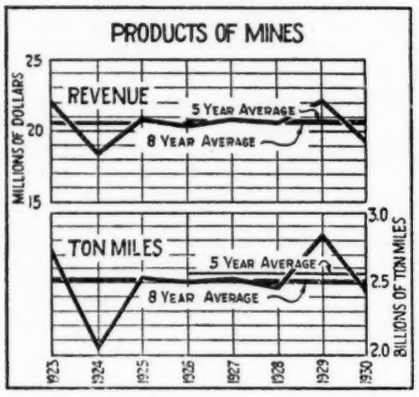
A study of the sources of freight revenue for the year 1930, compared with 1929 shows that the revenue from "Products of Agriculture" decreased $2,697,250 or 12.7%, and tonnage decreased 673,373 or 9.3%; revenue from "Animals and Products" decreased $729,570 or 5.0% and tonnage decreased 143,290 or 5.6%; revenue from "Products of Mines" decreased $2,635,725 or 11.9%, and tonnage decreased 2,640,696 or 13.7%; revenue from "Products of Forests" decreased $5,406,268 or 30.0% and tonnage decreased 2,421,133 or 31.3%; revenue from "Manufactures and Miscellaneous" decreased $6,873,009 or 15.3%, and tonnage decreased 2,166,709 or 15.9%; revenue from L.C.L. freight decreased $3,196,516 or 19.5%, and tonnage decreased 285,575 or 18.7%.

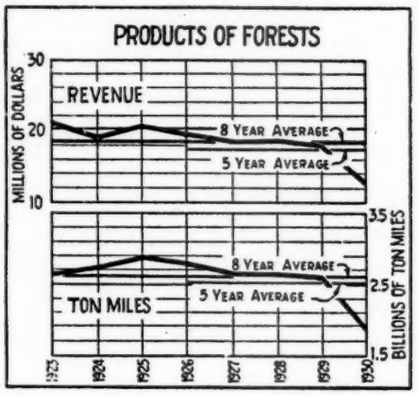
Charts showing the trend of revenue and revenue ton miles of carload freight by commodity groups for the past eight years are shown. This information is not given for the full ten years as it is not available for the period prior to 1923.

[Advertisement]





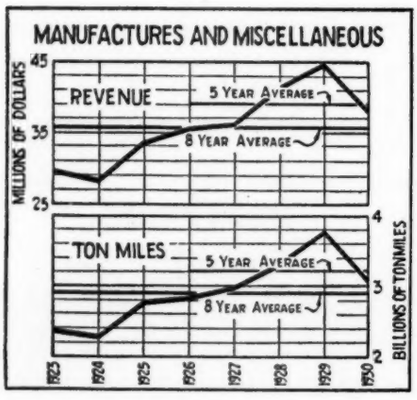




Passenger revenue and passenger service train revenue for 1930 in comparison with 1929 have been discussed.

The number of revenue passengers carried during 1930 was 6,078,523 as against 7,444,431 in 1929. The number of passengers carried one mile in 1930 was 449,338,901 as campared with 572,419,772 in 1929.

Excluding commutation passengers: the average miles per revenue passenger carried in 1930 were 149.74 as compared with 136.35 in 1929; the average revenue per passenger in 1930 was $4.64 as compared with $4.32 in 1929; and the revenue per passenger per mile in 1930 was 3.10 cents as compared with 3.17 cents in 1929.



The accompanying chart shows the trend of passenger revenue for the past ten years. The average for the ten years was $20,342,129 and for the last five years $17,266,818.

As compared with 1929, mail revenue in 1930 decreased $327,084 or 8.5%, of which $237,538 was due to a retroactive increase in mail pay for the first seven months of 1928, received in 1929; express revenue decreased $1,218,351 or 26.6%; milk revenue decreased $162,916 or 17.9%; switching revenue decreased $626,436 or 16.8%, and all other operating revenues decreased $847,015 or 19.4%.

Operating Expenses, Equipment Rents and Tax Accruals

As compared with 1929, operating expenses for 1930 decreased as follows: Maintenance of Way and Structures, $5,531,621; Maintenance of Equipment, $2,955,312; Traffic, $38,544; Transportation, $7,347,439; Miscellaneous Operations $267,986; General Expenses, $235,446. Total Railway Operating Expenses for the year 1930 were $112,295,805 as compared with $128,800,861 for 1929, a decrease of $16,505,056 or 12.8%; Railway Tax Accruals decreased $147,912 or 1.5%, and Equipment Rents decreased $1,931,209 or 48.3%.

Charts showing the trend during the past ten years of Maintenance Expenses, Transportation Expenses, Equipment Rents, and Tax Accruals are shown.

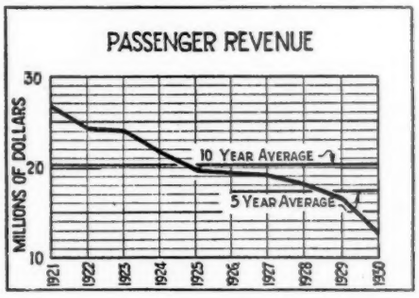
The average annual expense in the ten-year period for Maintenance was $58,113,837; in the past five-year period, $58,198,376, and for the year 1930, $50,535,380.

The yearly average in the ten-year period for Transporation Expenses was $61,550,849; in the past five-year period, $58,612,104 and for the year 1930, $53,124,009.

The item of Equipment Rents consists of amounts paid private car companies for the use of their cars and the net paid or received as the case may be, for railroad-owned equipment. The average annual payments as rent for private cars in the ten-year period was $2,550,092; in the past five-year period was $3,025,709, and for the year 1930, $3,210,137.

The increased payments for private car mileage do not indicate an undesirable condition, for while increased private car miles means additional payments, they also mean additional revenues in excess of the payments. This is not so in the case of railroad-owned equipment which during periods of depression stands idle, but the interest and depreciation charges on the investment and a certain amount of maintenance expense continue.

The average annual net payment for railroad-owned equipment in the ten-year period was $736,662; in the past five-year period was $90,544, and for the year 1930 the amounts received exceeded the amounts paid by $1,146,037.

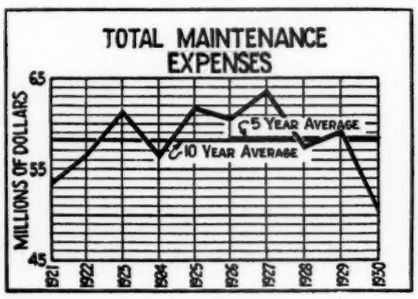


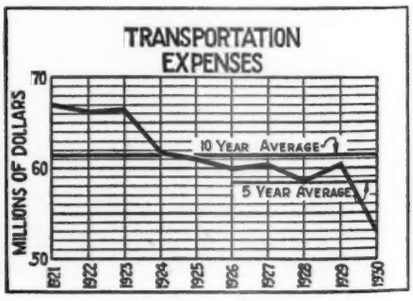
In the ten-year period the average annual net payment for the combined Equipment Rents amounted to $3,286,754; in the past five-year period to $3,116,253, and for the year 1930 to $2,064,100.

The average annual Railway Tax Accruals for the ten-year period was $9,214,365; in the past five-year period, $9,431,950, and for the year 1930, $9,501,000.

Miscellaneous

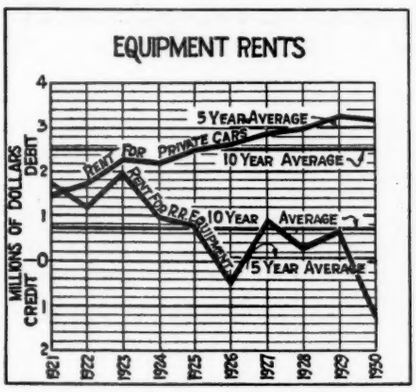
The rate of return earned on investment in road and equip-

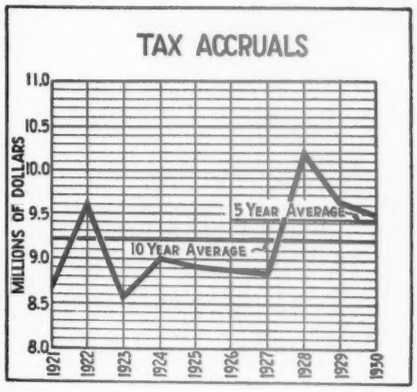

TOTAL MAINTENANCE EXPENSES
MILLIONS OF DOLLARS
5 YEAR AVERAGE
10 YEAR AVERAGE
1921 1922 1923 1924 1925 1926 1927 1928 1929 1930


TRANSPORTATION EXPENSES
MILLIONS OF DOLLARS
10 YEAR AVERAGE
5 YEAR AVERAGE
1921 1922 1923 1924 1925 1926 1927 1928 1929 1930

[ADVERTISEMENT]

ment, including material and supplies and cash at the beginning of the year was 2.12% as compared with 3.58% for the year 1929, and with 5.75% fixed by the Interstate Commerce Commission as a fair rate of return. For the entire Western District the average rate of return for 1930 was 3.14% as compared with 4.55% for 1929. For the Northwestern Region, in which this Company is grouped, the rate of return for 1930 was 2.55% as compared with 4.15% for 1929. The deficiency in the fair return for the Western District for 1930 was $289,557,000 as compared with $129,954,000 for 1929; for the Northwestern Region, $116,590,000 as compared with $56,606,000 for 1929; for this Company, $27,397,000 as compared with $15,980,000 for 1929.





Reference is made in the annual report for 1929 to the application of the Western Trunk Line carriers to the Interstate Commerce Commission for an increase in class rates. The Commission rendered its decision in this case on May 6 1930, which becomes effective June 15, 1931, providing for both increases and reductions in these rates, the increases applying generally on short haul traffic and the decreases on long haul traffic. It is doubtful if higher rates on short haul traffic, which is particularly susceptible to motor truck competition, will increase to any substantial extent the rail carriers' revenues and, in view of reductions in long haul traffic, it is questionable whether any substantial increased revenues will result from this decision.

On July 1, 1930, the Interstate Commerce Commission rendered its decision requiring a general readjustment of rates on grain and grain products within the Western District. The Commission has fixed June 1, 1931, as the effective date of its order. The exact effect of this decision cannot yet be determined but it will result in a substantial reduction in revenues from this traffic.

On February 8, 1930, the Interstate Commerce Commission granted authority to this Company to acquire and operate the property of the Chicago, Milwaukee and Gary Railway Company, the entire capital stock of which was acquired in 1922, and the property was taken over on April 1, 1930, and has since been operated as a part of this railroad.

The operated mileage at the close of the year and the income for the year ended December 31, 1930, were as follows:

OPERATED MILEAGE AT CLOSE OF YEAR

Miles of road	11,325.79
Miles of additional main tracks	1,294.42
Miles of yard tracks and sidings	4,370.35
Total Mileage Operated	16,990.56

CONDENSED INCOME ACCOUNT
YEAR ENDED DECEMBER 31, 1930

	Year 1930	Comparison with 1929 +Increase —Decrease
RAILWAY OPERATING INCOME:		
Railway operating revenues	$142,569,631.54	$—28,791,753.82
Railway operating expenses	112,295,804.91	—16,505,055.86
Net railway operating revenue	$ 30,273,826.63	$—12,286,697.96
Railway tax accruals	9,501,000.00	— 147,912.33
Uncollectible railway revenues	19,229.92	+ 6,640.81
Railway operating income	$ 20,753,596.71	$—12,145,426.44
Equipment rents—Debit balance	2,064,099.71	— 1,931,209.52
Joint facility rents—Debit balance	2,734,949.14	+ 105,558.57
Net railway operating income	$ 15,954,547.86	$—10,319,775.49
NON OPERATING INCOME		
Rents from lease of road	$ 364,223.62	$+ 25,205.38
Rents received—Other	653,245.01	— 96,236.62
Dividends on stocks	810,864.65	— 821.37
Income from funded securities:		
Interest on bonds and notes	737,675.88	— 154,820.37
Interest on advances to affiliated companies	14,379.74	+ 5,381.88
Income from unfunded securities and accounts:		
Interest on demand loans and deposits and time loans and deposits	368,879.75	— 685,284.88
Interest on equipment trust funds	5,112.91	— 15,751.61
Interest on bank balances	198,182.53	+ 5,918.67
Miscellaneous interest	45,975.25	+ 43,366.59
Miscellaneous income	21,876.99	+ 6,207.86
	$ 3,220,416.33	$— 866,834.47
Net railway and non operating income	$ 19,174,964.19	$—11,186,609.96
DEDUCTIONS:		
Rents paid—Lease of road	$ 1,094,090.33	$— 6,426.38
Rents paid—Other	63,318.21	+ 1,969.31
Interest on unfunded debt	37,139.70	+ 8,105.70
Amortization of discount on funded debt	17,480.52	+ 17,480.52
Miscellaneous	61,728.86	— 32,877.58
	$ 1,273,757.62	$— 11,748.43
Net income before deduction for interest on funded debt	$ 17,901,206.57	$—11,174,861.53
Interest on fixed interest bearing obligations	$ 13,642,931.75	$+ 784,562.75
Net income before deduction for interest on Convertible Adjustment Mortgage Bonds	$ 4,258,274.82	$—11,959,424.28
Interest on Convertible Adjustment Mortgage Bonds (5% accrued)	9,143,684.65	
Net income *(deficit)*	$ *4,885,409.83*	$—11,959,424.28
Income applied to sinking and other reserve funds	9,406.65	— 2,584.81
Debit balance transferred to Profit and Loss	$ *4,894,816.48*	$—11,956,839.47

Investment in Road and Equipment

The expenditures chargeable to Investment in Road and Equipment during the year ended December 31, 1930, and the total Investment in Road and Equipment December 31, 1930, were as follows:

Equipment purchased and constructed:		
15 Steam locomotives, purchased	$1,412,678.12	
15 Locomotive tenders, constructed	212,545.59	
2 Oil-electric switch engines, purchased	117,424.55	
700 Box cars, purchased	1,664,705.37	
500 Stock cars, purchased	1,062,561.68	
32 Ballast cars, purchased	65,348.02	
2000 Gondola cars, purchased	5,306,036.28	
10 Gondola cars, narrow gauge, constructed	12,380.13	
112 Ore cars, purchased	250,655.22	
690 Flat cars, purchased	1,120,556.68	
1 Flat car, constructed	632.68	
4 Mail apartment cars, constructed	187,019.23	
1 Shop locomotive, purchased	7,026.10	
1 Jordan ditcher, purchased	26,514.01	
2 Locomotive cranes, purchased	33,325.02	
10 Other company service units, purchased	13,675.71	
2 Other company service units, constructed	2,270.26	
1 Car barge, purchased	11,399.67	
Miscellaneous Equipment:		
2 Motor busses, purchased	13,701.06	
2 Automobile trucks, purchased	2,341.24	
4 Passenger automobiles, purchased	2,176.21	
Equipment acquired from Chicago, Milwaukee and Gary Railway Company:		
15 Steam locomotives	79,364.00	
6 Caboose cars	2,614.00	
1 Company service cars	113.00	
1 Ford coupe	25.00	
Other Additions and Betterments to Equipment:		
Miscellaneous conversions of equipment	207,099.45	
Other improvements to equipment	340,313.27	
Gross Additions and Betterments—Equipment		$12,154,501.55
Credit—Equipment retired or converted		1,235,633.52
Net Additions and Betterments—Equipment		$10,918,868.03
Additions and Betterments—Road:		
Land for transportation purposes	$ 988,395.24	
Grading	1,733,429.58	
Bridges, trestles and culverts	1,868,691.76	
Ties	258,737.51	
Rails	569,968.63	
Other track material	1,077,784.22	
Ballast	419,524.66	
Track laying and surfacing	308,909.83	
Right of way fences, etc.	23,677.77	

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GENERAL BALANCE SHEET

Asset Side	As of December 31, 1930	Comparison with December 31, 1929 +Increase —Decrease
Investments:		
Road and equipment	$720,377,652.81	$+20,100,286.39
Improvements on leased railway property	$ 416,583.93	$+ 53,191.51
Sinking funds		$— 1,111.57
Deposits in lieu of mortgaged property sold	$ 25,282.30	$— 71,918.24
Miscellaneous physical property	$ 5,420,874.69	$+ 456,436.18
Investments in affiliated companies:		
Stocks	$ 5,365,141.40	$— 12,611.00
Bonds	1,133,801.00	— 26,999.00
Notes	10,412,730.17	— 1,012,338.99
Advances	6,916,323.91	— 410,498.19
	$ 23,827,996.48	$— 1,462,447.18
Other Investments:		
Stocks	$ 7,870.39	
Bonds	166,250.00	$+ 1,000.00
Notes	456,081.72	— 83,072.62
Miscellaneous	2,395.79	— 395.56
	$ 632,597.90	$— 82,468.18
Total investments	$750,700,988.11	$+18,991,968.91
Current Assets:		
Cash	$ 12,124,554.04	$+ 4,268,425.54
Demand loans and deposits		— 5,700,000.00
Time deposits	8,315,622.83	+ 7,000,850.09
Special deposits	201,818.82	— 1,411,264.67
Loans and bills receivable	5,519,799.27	— 4,395,398.22
Traffic and car-service balances receivable	560,806.21	— 134,174.32
Due from agents and conductors	2,825,250.58	— 898,477.82
Miscellaneous accounts receivable	2,764,551.27	— 580,687.90
Material and supplies	12,550,886.62	— 1,374,623.91
Interest and dividends receivable	399,970.72	— 215,248.86
Rents receivable	175.00	— 2.00
Other current assets	49,556.25	— 21,837.73
Total current assets	$ 45,312,991.61	$— 3,462,439.80
Deferred Assets:		
Working fund advances	$ 56,944.22	$+ 7,585.24
Insurance and other funds	114,215.35	+ 114,215.35
Other deferred assets	2,454,288.91	— 35,858.30
Total deferred assets	$ 2,625,448.48	$+ 85,942.29
Unadjusted Debits:		
Insurance premiums paid in advance	$ 19,888.79	$+ 2,688.31
Discount on funded debt	473,897.56	+ 473,897.56
Other unadjusted debits	3,102,679.19	— 941,745.86
Total unadjusted debits	$ 3,596,465.54	$— 465,159.99
Grand Total	$802,235,893.74	$+15,150,311.41

Liability Side	As of December 31, 1930	Comparison with December 31, 1929 +Increase —Decrease
Capital Stock:		
Common Stock:		
In hands of public (1,174,060 shares—no par value)	$136,649,794.62	$— 1,779,801.16
Preferred Stock:		
In hands of public	119,280,100.00	+ 41,300.00
Total Capital Stock	$255,929,894.62	$— 1,738,501.16
Governmental Grants:		
Grants in aid of construction	$ 24,745.93	$+ 13,048.87
Funded Debt—Unmatured:		
Bonds:		
In hands of Public:		
Fixed interest bearing	$255,690,096.00	$+17,964,000.00
Contingent interest bearing	182,873,693.00	
In Treasury of Company	11,215,000.00	+ 4,997,000.00
Pledged	58,000.00	—20,000,000.00
	$449,836,789.00	$+ 2,961,000.00
Equipment Obligations:		
Equipment gold notes	5,254,500.00	— 1,318,500.00
Equipment gold notes in treasury	223,000.00	+ 223,000.00
Equipment Trust certificates	39,532,000.00	+ 2,882,000.00
General American Tank Car Corporation—Lease	1,049,688.27	+ 1,049,688.27
	$495,895,977.27	$+ 5,797,188.27
Less Bonds and Equipment Gold Notes held in Treasury or pledged	11,496,000.00	—14,780,000.00
Total Funded Debt unmatured	$484,399,977.27	$+20,577,188.27
Total Capital Stock, Funded Debt and Governmental Grants	$740,354,617.82	$+18,851,735.98
Current Liabilities:		
Loans and bills payable		$— 42,921.62
Traffic and car-service balances payable	$ 3,067,072.37	— 384,103.01
Payrolls and vouchers	7,595,513.06	— 3,390,378.60
Miscellaneous accounts payable	281,869.00	— 80,088.25
†Interest matured unpaid	3,231,335.60	+ 224,760.12
Funded debt matured unpaid	8,500.00	+ 1,500.00
*Unmatured interest accrued	9,266,229.17	+ 1,865,909.84
Unmatured rents accrued	304,865.60	+ 325.57
Other current liabilities	370,562.61	— 92,865.01
Total current liabilities	$ 24,125,947.41	$— 1,897,860.96
Deferred Liabilities:		
Other deferred liabilities	$ 871,523.87	$+ 8,789.80
Total deferred liabilities	$ 871,523.87	$+ 8,789.80
Unadjusted Credits:		
Tax liability	$ 8,282,516.64	$— 60,148.43
Accrued depreciation—Equipment	17,021,684.64	+ 6,098,441.29
Other unadjusted credits	3,544,692.11	— 975,013.12
Total unadjusted credits	$ 28,848,893.39	$+ 5,063,279.74
Corporate Surplus:		
Additions to property through income and surplus	$ 314,743.93	$+ 135,905.50
Funded debt retired through income and surplus	33,638.03	+ 9,830.00
Sinking fund reserve—Bell, Bay & Brit. Col. R. R. Co.	872.50	— 333.35
Total appropriated surplus	$ 349,254.46	$+ 145,402.15
Profit and loss, credit balance	7,685,656.79	— 7,021,035.30
Total corporate surplus	$ 8,034,911.25	$— 6,875,633.15
Grand Total	$802,235,893.74	$+15,150,311.41

†Includes $2,877,983.03 payable January 1, 1931.
*Includes interest on the Convertible Adjustment Mortgage Bonds in the amount of $6,400,579.25.

Profit and Loss Account December 31, 1930

DEBIT	
Debit balance for the year 1930, transferred from Income	$ 4,894,816.48
Surplus applied to sinking and other reserve funds	90.00
Appropriated from surplus account of donations	135,905.50
Debit discount extinguished through surplus	Cr. 252.13
Loss on retired road	1,694,987.56
Miscellaneous debits	579,269.09
Credit balance, December 31, 1930, carried to general balance sheet	$ 7,685,656.79
	$ 14,990,473.29
CREDIT	
Credit balance, December 31, 1929	$ 14,706,692.09
Profit on road and equipment sold	16,767.27
Unrefundable overcharges	14,237.99
Construction donations	154,840.01
Miscellaneous credits	97,935.93
	$ 14,990,473.29

Crossing and signs	621,459.17
Station and office buildings	871,955.58
Roadway and miscellaneous buildings	172,662.02
Water and fuel stations	291,600.78
Shops and engine houses	710,128.90
Storage warehouses	152,467.92
Wharves and docks	112,928.51
Telegraph and telephone lines	145,364.00
Signals and interlockers	154,364.00
Power stations, transmission systems, etc.	197,295.63
Paving and assessments	114,255.64
Roadway machines and tools	327,170.42
Shop machinery	599,562.92
Miscellaneous	277,646.55
Road property acquired from Chicago, Milwaukee and Gary Railway Company	2,750,511.01
Gross Additions and Betterments—Road	$ 14,638,469.81
Credit—Road property retired or converted	5,125,382.77
Net Additions and Betterments—Road	9,513,087.04
Net Additions and Betterments—Road and Equipment	$ 20,431,955.07
Less—Adjustment of Road and Equipment as of January 14, 1928	331,668.68
Net increase in Road and Equipment	20,100,286.39
Road and Equipment, December 31, 1929	700,277,366.42
Road and Equipment, December 31, 1930	$720,377,652.81

Income account, general balance sheet, profit and loss and other tables relating to corporate affairs and statements showing results of operation are appended hereto.

The Board records its appreciation of the co-operation and the loyal and efficient services rendered by the officers and employees throughout the year.

By order of the Board of Directors, H. A. SCANDRETT
April 1, 1931. President.

[Advertisement]

Chicago and North Western Railway Company

Report of the Board of Directors

To the Stockholders of the Chicago and North Western Railway Company:

The Board of Directors submits herewith its report of the operations and affairs of the Company for the year ending December 31, 1930.

Average mileage of road operated, 8,458.52.

OPERATING REVENUES:		
Freight	$95,922,883.43	
Passenger	19,366,434.73	
Other Transportation	12,023,460.80	
Incidental	2,717,694.93	
		$130,030,473.89
OPERATING EXPENSES:		
Maintenance of Way and Structures	$19,195,307.76	
Maintenance of Equipment	24,389,363.16	
Traffic	2,601,531.16	
Transportation	49,853,179.96	
Miscellaneous Operations	992,815.06	
General	4,621,581.92	
Transportation for Investment—Cr.	Cr. 562,355.33	
		101,091,423.69
Percentage of Expenses to Revenues	77.74	
Net Revenue from Railway Operations		$ 28,939,050.20
DEDUCTIONS FROM REVENUE:		
Railway Tax Accruals (6.51 per cent of Revenues)	$ 8,462,677.16	
Uncollectible Railway Revenues	21,346.03	
Equipment Rents—Net	2,755,707.44	
Joint Facility Rents—Net	266,468.69	
		11,506,199.32
Net Railway Operating Income		$ 17,432,850.88
NONOPERATING INCOME:		
Rental Income	$ 751,906.93	
Dividend Income	3,112,734.00	
Income from Funded Securities	1,821,835.74	
Income from Unfunded Securities and Accounts, and Other Items	1,610,093.45	
		7,296,570.12
Gross Income		$ 24,729,421.00
MISCELLANEOUS DEDUCTIONS FROM GROSS INCOME		54,233.45
Income Available for Fixed Charges		$ 24,675,187.55
FIXED CHARGES:		
Rental Payments	$ 19,635.85	
Interest on Funded Debt	16,241,372.31	
Interest on Unfunded Debt	71,988.44	
		16,332,996.60
Net Income		$ 8,342,190.95
DIVIDENDS:		
7% on Preferred Stock	$ 1,567,650.00	
4% on Common Stock	6,337,558.00	
		7,905,208.00
Balance Income for the Year		$ 436,982.95

General Remarks

During the year additions and betterments chargeable to capital account in the amount of $16,430,823.25 were made. An analysis of this expenditure by accounts and classes of property will be found in another part of this report under the heading "Additions and Betterments."

The more important improvements carried forward during the year are as follows:

At Chicago, Illinois, Wood Street Yard, in the area formerly occupied by the Wood Street freight transfer house, a potato and vegetable yard was constructed. A series of tracks with concrete paved driveways capable of handling 540 cars were built. A brick office building, platform scales in various locations, and other auxiliary facilities necessary to adapt the yard to the handling of this important item of traffic were installed as a part of the facility.

An additional main track on the Wisconsin Division, extending from the end of the third track system at Des Plaines, Illinois, was built northward to Barrington, a distance of 13.8 miles. Additional platforms were provided at each of the suburban stations throughout the territory in which the track was constructed. Additional team tracks were installed at Arlington Heights, and additional coach tracks at Barrington, and a new passenger station was erected at Mount Prospect. New automatic signals of the light type were installed in this area, replacing the old disc signals.

At Omaha, Nebraska, 8.27 acres in the Dodge Street Yard were leased to the Cargill Grain Company of Nebraska, who constructed thereon a concrete grain elevator having a storage capacity of 5,000,000 bushels. The Railway Company constructed a concrete and steel workhouse to be used in connection therewith, having a capacity of 230,000 bushels. Additional yard tracks at this point and at the South Omaha Yard were provided, increasing the car capacity of these yards from 190 cars to a total of 450 cars.

At Milwaukee, Wisconsin, the Kinnickinnic elevator was enlarged by the addition of 2,000,000 bushels storage capacity, and a mechanical car unloader was installed.

At Sioux City, Iowa, an addition with a capacity of 40,000 bushels was made to the Pearl Street elevator.

At Beverly, Iowa, 2.2 miles of yard tracks were added for the classification and storage of grain cars intended for unloading at Cedar Rapids, Iowa.

At Rapid City, South Dakota, a concrete and brick building, 130 by 225 feet, having two stories and a basement, was constructed on Company land. This building has been leased as a storage warehouse, with a portion of the space being reserved by the Railway Company for use as a freight house.

Spurs in the logging district of Northern Wisconsin and Michigan were built, viz.: 5.6 miles at the end of the Gogebic Line; 2.4 miles at Long Lake, Wisconsin; and 2.8 miles at Phelps, Wisconsin.

Work was continued during the year on the new L. C. L. freight house at Wells Street; on the Railway Express Terminal at Milwaukee Avenue and West Kinzie Street; and on the grade separation at Sixteenth and Canal Streets, on the South Branch Line; all in the city of Chicago.

At Kenosha, Wisconsin, elevation of the tracks through the city was commenced. The work will be spread over a period of three years.

During the year the Company received and placed in service new equipment, as follows:

LOCOMOTIVES:
1 100-ton, 600 H. P. Diesel Electric Switching Locomotive.
PASSENGER TRAIN CARS:
5 70-ft. All Steel Horse Cars, for use in passenger train service.
FREIGHT TRAIN CARS:
383 50-ft. Steel Underframe, 50 ton capacity Flat Cars.
10 70-ton capacity, Steel Underframe Flat Cars.

During the year, 528 new industries were established at various places on the lines of the Company. These industries, classified in accordance with the products handled, are as follows:

Agricultural Implements	6
Automobiles, Vehicles	3
Coal	41
Foodstuffs (Dairy Products, Poultry)	19
Iron and Steel, Machinery, etc.	14
Petroleum Products	213
Sugar Beets	7
Construction Materials	15
Forest Products	17
Live Stock	14
Sand and Gravel	24
Manufacturing and Miscellaneous	61
Building Material	18
Farm Products	13
Grain and Grain Products	18
Lumber	33
Stone	3
Road Building Contractors	6
State Institutions	1
Storage Warehouses	2
Total	528

The traffic anticipated as a result of the operations of these industries will produce from $500,000 to $750,000 revenue annually in normal times.

Capital Stock

During the year the Company issued $500.00 of Common Stock in exchange for a like amount of Common Stock Scrip, which had previously been issued pursuant to resolutions adopted by the Board of Directors and Stockholders, providing for the issue of Common Stocks in exchange for the Preferred and Common Stocks of the Chicago, St. Paul, Minneapolis and Omaha Ry. Co.

The only other change during the year in the Capital Stock was the purchase by the Company of $60.00 of its Common Stock Scrip.

The authorized Capital Stock of the Company is Three Hundred Million Dollars ($300,000,000.00), of which the following has been issued to December 31, 1930:

HELD BY THE PUBLIC:		
Common Stock	$158,439,200.00	
Common Stock Scrip	5,535.25	
Preferred Stock	22,395,000.00	
Preferred Stock Scrip	120.00	
Total Stock and Scrip held by the Public		$180,839,855.25

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HELD IN TREASURY:		
Common Stock	$ 2,342,000.00	
Common Stock Scrip	1,877.15	
Preferred Stock	3,700.00	
Preferred Stock Scrip	134.56	
Total Stock and Scrip held in Treasury		2,347,711.71
Total Capital Stock and Scrip, December 31, 1930		$183,187,566.96

Funded Debt

At the close of the preceding year, the amount of Funded Debt held by the Public was		$351,096,400.00
The above amount has been increase by Bonds and Equipment Trust Certificates sold during the year ending December 31, 1930, as follows:		
C. & N. W. Ry. 20-year Convertible Gold Bonds, Series A, 4¾%, authorized at a special meeting of the stockholders held November 18, 1929, being the balance due on $2,060,000.00 of bonds sold on partial payment plan	$ 1,030,000.00	
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, 4¾%, sold to reimburse the Company for past expenditures made for construction, and in redeeming and retiring underlying bonds	5,031,000.00	
C. & N. W. Ry. First and Refunding Mortgage, Series "C," 4½%, sold to reimburse the Company for past expenditures made for construction	12,000,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1929, 4½%, Series "X"	1,425,000.00	
Total Funded Debt Sold		19,486,000.00
Total		$370,582,400.00
And the above amount has been decreased during the year ending December 31, 1930, by Bonds and Equipment Trust Certificates redeemed, as follows:		
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%	$ 92,000.00	
C. & N. W. Ry. 10-year Secured Gold Bonds, 7%	14,421,000.00	
C. & N. W. Ry. Equipment Gold Notes of 1920, 6%	664,900.00	
C. & N. W. Ry. Equipment Trust Certificates of 1920, 6½%:		
Series "J" $186,000.00		
Series "K" 267,000.00	453,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1922, 5%:		
Series "M" $345,000.00		
Series "N" 317,000.00	662,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1923, 5%:		
Series "O" $412,000.00		
Series "P" 104;000.00	516,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1925, 4½%:		
Series "Q" $361,000.00		
Series "R" 130,000.00		
Series "S" 174,000.00	665,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1927, 4½%:		
Series "T" $183,000.00		
Series "U" 143,000.00		
Series "V" 330,000.00	656,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1929, 4½%:		
Series "W"	255,000.00	
Total Funded Debt Redeemed		18,384,900.00
Leaving Funded Debt held by the Public, December 31, 1930		$352,197,500.00

Lands

During the year ending December 31, 1930, 4,253.95 acres and 1 town lot of the Company's Land Grant lands were sold for the total consideration of $12,791.15. The number of acres remaining in the several Grants December 31, 1930, amounted to 64,001.95 acres, of which 249.01 acres were under contract for sale, leaving unsold 63,752.94 acres.

Appended hereto may be found statements, accounts and statistics relating to the business of the fiscal year and the condition of the Company's affairs on December 31, 1930.

The Board gratefully acknowledges its appreciation of the loyal and efficient services rendered by officers and employes during the year.

By order of the Board of Directors.

FRED W. SARGENT,
President.

Chicago, April 1, 1931.

Comparative General Balance Sheet

(8,384.56 Miles)

December 31, 1929	ASSETS	December 31, 1930
	INVESTMENTS	
$562,523,169.98	Investment in Road and Equipment	$574,015,751.72
1,035,787.77	Miscellaneous Physical Property	1,012,633.85
	Investment in Affiliated Companies:	
10,337,152.29	Capital Stock of Chicago, St. Paul, Minneapolis and Omaha Ry. Co. (149,200 Shares), acquired by purchase	10,337,152.29
13,288,971.43	Capital Stock of Chicago, St. Paul, Minneapolis and Omaha Ry. Co. (130,060 Shares), acquired in exchange for C. & N. W. Ry. Co. Common Stock	13,288,971.43
15,925,769.51	Bonds of C. St. P. M. & O. Ry. Co., due in 1930	.....
.....	Note of C. St. P. M. & O. Ry. Co., 5½%, due January 1, 1940	45,186,000.00
2,416,453.15	Miscellaneous	2,725,486.48
	Investment in Other Companies:	
3,910,575.93	Preferred Stock of Union Pacific Railroad Company (41,715 Shares)	3,910,575.93
151,770.00	Miscellaneous	151,770.00
577,956.16	Other Investments	73,449.75
$610,167,606.22	Total Investments	$650,701,791.15
	CURRENT ASSETS	
$ 51,833,195.34	Cash	$ 8,368,443.42
2,518,500.00	Loans and Bills Receivable	34,000.00
334,892.86	Traffic and Car Service Balances Receivable	289,418.55
2,663,353.30	Net Balance Receivable from Agents and Conductors	2,082,255.95
7,829,013.46	Miscellaneous Accounts Receivable	9,164,952.58
11,684,629.53	Material and Supplies	11,091,876.83
774,598.02	Other Current Assets	579,070.29
$ 77,638,182.51	Total Current Assets	$ 31,610,016.82
	UNADJUSTED DEBITS	
$ 2,347,651.71	Capital Stock and Scrip, C. & N. W. Ry. Co., Held in Treasury	$ 2,347,711.71
	Company Bonds Held in Treasury and Due from Trustee:	
13,399,000.00	Unpledged	40,975,000.00
35,500,000.00	Pledged	18,000,000.00
2,634,799.39	Other Unadjusted Debits	2,622,407.05
$ 53,881,451.10	Total Unadjusted Debits	$ 63,945,118.76
$741,687,239.83	Total Assets	$746,256,927.03

December 31, 1929	LIABILITIES	December 31, 1930
	CAPITAL STOCK	
$180,839,915.25	Held by Public	$180,839,855.25
2,347,651.71	Held in Treasury	2,347,711.71
$183,187,566.96	Total Capital Stock	$183,187,566.96
29,657.75	Premium Realized on Capital Stock	29,657.75
$183,217,224.71	Total Capital Stock and Premium	$183,217,224.71
	LONG TERM DEBT	
$351,096,400.00	Funded Debt Held by the Public	$352,197,500.00
	Funded Debt Held in Treasury and Due from Trustee:	
13,399,000.00	Unpledged	40,975,000.00
35,500,000.00	Pledged	18,000,000.00
$399,995,400.00	Total Long Term Debt	$411,172,500.00
	CURRENT LIABILITIES	
$ 4,415,803.93	Traffic and Car Service Balances Payable	$ 3,867,728.42
9,025,290.23	Audited Accounts and Wages Payable	4,066,431.90
246,590.46	Miscellaneous Accounts Payable	172,864.80
686,747.34	Interest Matured Unpaid	672,504.09
46,808.70	Dividends Matured Unpaid	57,074.45
2,811,746.20	Unmatured Interest Accrued	2,811,081.18
983,558.92	Other Current Liabilities	744,294.19
$ 18,216,545.78	Total Current Liabilities	$ 12,391,979.03
	UNADJUSTED CREDITS	
$ 8,632,703.35	Tax Liability	$ 7,101,850.90
567,668.95	Premium on Funded Debt	567,919.56
49,462,032.75	Accrued Depreciation—Equipment	52,905,157.44
1,407,479.40	Other Unadjusted Credits	738,225.47
$ 60,069,884.45	Total Unadjusted Credits	$ 61,313,152.47
	CORPORATE SURPLUS	
$ 2,977,367.36	Additions to Property Through Surplus	$ 3,048,215.29
77,210,817.53	Profit and Loss	75,113,855.53
$ 80,188,184.89	Total Corporate Surplus	$ 78,162,070.82
$741,687,239.83	Total Liabilities	$746,256,927.03

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Comparative Statement of Income Account

	Year Ending Dec. 31,1929	Year Ending Dec. 31, 1930	+Increase or —Decrease
Average mileage of road operated	8,465.38	8,458.52	— 6.86
OPERATING REVENUES:			
Freight	$112,029,702.20	$ 95,922,883.43	—$16,106,818.77
Passenger	23,863,936.83	19,366,434.73	— 4,497,502.10
Other Transportation	15,497,379.26*	12,023,460.80	— 3,473,918.46
Incidental	3,341,929.14	2,717,694.93	— 624,234.21
Total Operating Revenues	$154,732,947.43	$130,030,473.89	—$24,702,473.54
OPERATING EXPENSES:			
Maintenance of Way and Structures	$ 22,000,106.93	$ 19,195,307.76	—$ 2,804,799.17
Maintenance of Equipment	28,536,623.83	24,389,363.16	— 4,147,260.67
Traffic	2,650,107.21	2,601,531.16	— 48,576.05
Transportation	56,832,275.62	49,853,179.96	— 6,979,095.66
Miscellaneous Operations	1,158,959.63	992,815.06	— 166,144.57
General	4,634,700.91	4,621,581.92	— 13,118.99
Transportation for Investment—Cr.	Cr. 526,733.74	Cr. 562,355.33	— 35,621.59
Total Operating Expenses	$115,286,040.39	$101,091,423.69	—$14,194,616.70
Net Revenue from Railway Operations	$ 39,446,907.04	$ 28,939,050.20	—$10,507,856.84
DEDUCTIONS FROM REVENUE:			
Railway Tax Accruals	$ 10,238,843.71	$ 8,462,677.16	—$ 1,776,166.55
Uncollectible Railway Revenues	17,621.88	21,346.03	+ 3,724.15
Equipment Rents—Net	2,741,070.89	2,755,707.44	+ 14,636.55
Joint Facility Rents—Net	229,221.10	266,468.69	+ 37,247.59
Total Deductions	$ 13,226,757.58	$ 11,506,199.32	—$ 1,720,558.26
Net Railway Operating Income	$ 26,220,149.46	$ 17,432,850.88	—$ 8,787,298.58

* Includes $1,349,492.99 Back Mail Pay for period May 9, 1925 to July 31, 1928.

NONOPERATING INCOME:			
Rental Income	$ 698,252.74	$ 751,906.93	+$ 53,654.19
Dividend Income	1,512,734.00	3,112,734.00	+ 1,600,000.00
Income from Funded Securities	122,280.90	1,821,835.74	+ 1,699,554.84
Income from Unfunded Securities and Accounts, and other Items	858,099.45	1,610,093.45	+ 751,994.00
Total Nonoperating Income	$ 3,191,367.09	$ 7,296,570.12	+$ 4,105,203.03
Gross Income	$ 29,411,516.55	$ 24,729,421.00	—$ 4,682,095.55
MISCELLANEOUS DEDUCTIONS FROM GROSS INCOME	$ 66,817.33	$ 54,233.45	—$ 12,583.88
Income Available for Fixed Charges	$ 29,344,699.22	$ 24,675,187.55	—$ 4,669,511.67
FIXED CHARGES:			
Rental Payments	$ 22,645.67	$ 19,635.85	—$ 3,009.82
Interest on Funded Debt	13,612,067.13	16,241,372.31	+ 2,629,305.18
Interest on Unfunded Debt	110,930.39	71,988.44	— 38,941.95
Total Fixed Charges	$ 13,745,643.19	$ 16,332,996.60	+$ 2,587,353.41
Net Income	$ 15,599,056.03	$ 8,342,190.95	—$ 7,256,865.08
DIVIDENDS:			
On Preferred Stock (7%)	$ 1,567,650.00	$ 1,567,650.00	
On Common Stock (4½%—1929) (4%—1930)	7,129,735.50	6,337,558.00	—$ 792,177.50
Total Dividends	$ 8,697,385.50	$ 7,905,208.00	—$ 792,177.50
Balance Income for the Year, carried to Profit and Loss	$ 6,901,670.53	$ 436,982.95	—$ 6,464,687.58

Profit and Loss—December 31, 1930

CHARGES FOR THE YEAR ENDING DECEMBER 31, 1930:		
Depreciation accrued prior to July 1, 1907, on equipment retired or changed from one class to another	$	92,376.98
Net loss on property sold or abandoned and not replaced		2,091,723.07
Debt discount incurred during the year extinguished through surplus		358,226.97
Credit Balance, December 31, 1930, carried to Balance sheet		75,113,855.53
		$77,656,182.55
Credit Balance, December 31, 1929		$77,210,817.53
CREDITS FOR THE YEAR ENDING DECEMBER 31, 1930:		
Credit Balance of current year's Income, brought forward from Income Account		436,982.95
Net profit from sale of Land Grant lands		5,175.97
Net Miscellaneous Credits		3,206.10
		$77,656,182.55

Chicago, Saint Paul, Minneapolis and Omaha Railway Company

Report of the Board of Directors

To the Stockholders of the Chicago, Saint Paul, Minneapolis and Omaha Railway Company:

The Board of Directors submits herewith its report of the operations and affairs of the Company for the year ended December 31, 1930.

Average mileage of road operated, 1,740.94

OPERATING REVENUES:		
Freight	$19,264,178.73	
Passenger	3,202,982.52	
Other Transportation	1,669,739.01	
Incidental	299,387.57	
		$24,436,287.83
OPERATING EXPENSES:		
Maintenance of Way and Structures	$ 3,731,981.42	
Maintenance of Equipment	4,788,218.41	
Traffic	487,715.74	
Transportation	10,362,239.19	
Miscellaneous Operations	168,503.20	
General	1,029,153.68	
Transportation for Investment—Cr.	Cr. 50,908.27	
Percentage of Expenses to Revenue	83.96	20,516,903.37
Net Revenue from Railway Operations		$ 3,919,384.46
DEDUCTIONS FROM REVENUE:		
Railway Tax Accruals (5.21 per cent of Revenues)	$ 1,274,194.51	
Uncollectible Railway Revenues	4,305.53	
Equipment Rents—Net	569,918.08	
Joint Facility Rents—Net	410,972.68	
		2,259,390.80
Net Railway Operating Income		$ 1,659,993.66
NONOPERATING INCOME:		
Rental Income	$ 83,996.41	
Dividend Income	37,856.90	
Income from Funded Securities	5,715.07	
Income from Unfunded Securities and Accounts, and Other Items	59,162.06	
		166,730.44
Gross Income		$ 1,826,724.10
DEDUCTIONS FROM GROSS INCOME:		
Rental Payments	$ 1,882.14	
Interest on Funded Debt	2,450,036.78	
Other Deductions	561,036.55	
		3,012,955.47
Net Deficit		$ 1,186,231.37

General Remarks

Freight revenues for the year 1930 decreased $1,421,413.81 or 6.87 per cent, as compared with the preceding year. The loss in revenue from grain was 10.38 per cent, and from handling of coal 2.67 per cent. Passenger revenues decreased $820,459.10 or 20.39 per cent, the greatest loss again occurring in local traffic which decreased 30 per cent. Other operating revenues also showed declines, the total decrease in operating revenues for the year being $2,782,710.26 or 10.22 per cent. Excluding from the comparison the back mail pay adjustment taken into revenues for the year 1929, as noted in the preceding report, the decrease for the year may be stated as $2,549,854.22 or 9.37 per cent.

There was a marked difference between the revenue returns for the first six months and last six months of the year 1930. Freight revenues, during the first six months showed an increase of 1.8 per cent. The decline characterizing the last

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half of the year was violent. Freight revenues, during that period, decreased 14.0 per cent.

In spite of the excessive decrease in passenger revenues, the transportation ratio for the year 1930 was actually held to a slight decrease as compared with the preceding year, as result of additional economies in freight and passenger operation. The transportation ratio for 1930 was 42.40 per cent, while that of 1929, excluding the back mail pay adjustment above mentioned, was 42.44 per cent. In comparison with the decrease of 6.87 per cent, in freight earnings and 6.5 per cent, in gross ton miles, it may be noted that freight train miles were decreased 9.27 per cent, gross tons per train were increased 2.0 per cent, train speed was increased 6.3 per cent, and the fuel consumption per gross ton mile was decreased 3.9 per cent.

In order to meet the growing decrease in passenger revenues, trains were discontinued at various times during the year with a total net annual reduction in passenger train miles of 651,507 or 18.1 per cent, of 1929 passenger train miles. Of this amount the actual saving in mileage effected in 1930 was 364,289, leaving a further saving of 287,218 miles which will be reflected in 1931.

Charges for Maintenance of Way and Structures decreased $299,584.51 as compared with the year 1929. Of this amount $95,513.78 was in the non-productive item of snow, ice and sand removal, leaving an actual decrease in effective maintenance expense of $204,070.73. Charges for ties decreased $197,546.41 and for rails $39,718.94. While approximately 46 miles of ballasting was done in 1929 this was increased to more than 130 miles in 1930.

Charges for Maintenance of Equipment decreased $190,185.59. Excluding the items of depreciation, retirements and joint facilities the decrease was $429,599.87 or 10.1 per cent, in effective equipment maintenance.

Long Term Debt

At the close of the preceding year the amount of Long Term Debt, held by the Public, was		$48,806,800.00
The above amount has been increased during the year ended December 31, 1930, by the sale of Equipment Trust Certificates and the issuance of a note to the Chicago and North Western Railway Company, as follows:		
Chicago, Saint Paul, Minneapolis and Omaha Railway Equipment Trust Certificates of 1928, Series "H", 4¼%..	$ 390,000.00	
Note to Chicago and North Western Railway Company dated June 1, 1930, payable on or before Jan. 1, 1940, 5½%..	45,186,000.00	
		45,576,000.00
		$94,382,800.00
And the above amount has been decreased during the year ended December 31, 1930, by Bonds and Equipment Trust Certificates redeemed, as follows:		
North Wisconsin Railway First Mortgage Bonds, 6%	$ 474,000.00	
Chicago, Saint Paul, Minneapolis and Omaha Railway Consolidated Mortgage Bonds, 6%	24,478,000.00	
Chicago, Saint Paul, Minneapolis and Omaha Railway Consolidated Mortgage Bonds, 3½%	3,734,000.00	
Superior Short Line Railway First Mortgage Bonds, 5%	1,500,000.00	
Chicago, Saint Paul, Minneapolis and Omaha Railway Debenture Gold Bonds of 1930, 5%	15,000,000.00	
Chicago, Saint Paul, Minneapolis and Omaha Railway Equipment Gold Notes, 6%	156,800.00	
Chicago, Saint Paul, Minneapolis and Omaha Railway Equipment Trust Certificates of 1917:		
Series "B", 7%	95,000.00	
Series "C", 4¼%	41,000.00	
Series "D", 4¼%	83,000.00	
Series "E", 4¼%	48,000.00	
Series "F", 4¼%	54,000.00	
Series "G", 4¼%	69,000.00	
Chicago, Saint Paul, Minneapolis and Omaha Railway Equipment Trust Certificates of 1928:		
Series "H", 4¼%	26,000.00	
Total Long Term Debt Redeemed		$45,758,800.00
Leaving Long Term Debt held by the Public and the Chicago and North Western Railway Company, December 31, 1930		$48,624,000.00

Capital Stock

There has been no change since the close of the preceding year in the Capital Stock and Scrip of the Company.

The Company's authorized Capital Stock is Fifty Million Dollars ($50,000,000), of which the following has been issued to December 31, 1930.

HELD BY THE PUBLIC:		
Common Stock	$18,556,700.00	
Common Stock Scrip	2,386.69	
Preferred Stock	11,259,300.00	
Preferred Stock Scrip	559.09	
Total Stock and Scrip held by the Public		$29,818,945.78
HELD IN TREASURY:		
Common Stock	$ 2,844,200.00	
Common Stock Scrip	6.64	
Preferred Stock	1,386,900.00	
Preferred Stock Scrip	74.20	
Total Stock and Scrip held in Treasury		4,231,180.84
Total Capital Stock and Scrip, December 31, 1930.		$34,050,126.62

Appended hereto may be found Statements and Accounts relating to the business of the Company for the year, and the condition of its affairs on December 31, 1930.

The Board desires to express its appreciation to the officers and employes of the Company for their loyal and efficient service during the year.

By order of the Board of Directors.

FRED W. SARGENT,
President.

St. Paul, Minnesota, April 1, 1931.

Comparative General Balance Sheet

(1,667.12 Miles)

December 31, 1929	ASSETS	December 31, 1930
	INVESTMENTS	
$ 92,943,003.87	Investment in Road and Equipment	$ 93,384,458.33
30,660.85	Improvements on Leased Railway Property	50,442.13
249,240.93	Miscellaneous Physical Property	258,668.84
593,089.53	Investment in Affiliated Companies	667,606.23
15,152.44	Other Investments	13,140.25
$ 93,831,147.62	Total Investments	$ 94,374,315.78
	CURRENT ASSETS	
$ 876,930.70	Cash	$ 446,457.75
44,118.85	Traffic and Car Service Balances Receivable	61,434.74
463,557.61	Net Balance Receivable from Agents and Conductors	342,265.24
512,364.96	Miscellaneous Accounts Receivable	494,676.24
2,056,463.55	Material and Supplies	2,034,296.13
$ 3,953,435.67	Total Current Assets	$ 3,379,130.10
	UNADJUSTED DEBITS	
$ 17,935.89	Discount on Funded Debt	$ 11,407.99
2,844,206.64	Common Stock and Scrip, C. St. P. M. & O. Ry. Co., Held in Treasury	2,844,206.64
1,386,974.20	Preferred Stock and Scrip, C. St. P. M. & O. Ry. Co., Held in Treasury	1,386,974.20
634.09	Consolidated Mortgage Bond Scrip Due from Central Union Trust Company	.....
.....	C. St. P. M. & O. Ry. First Mortgage Five Per Cent Gold Bonds, Series "A," Pledged	45,186,000.00
437,464.25	Other Unadjusted Debits	383,373.22
$ 4,687,215.07	Total Unadjusted Debits	$ 49,811,962.05
$102,471,798.36	Total Assets	$147,565,407.93

December 31, 1929	LIABILITIES	December 31, 1930
	CAPITAL STOCK	
$ 29,818,945.78	Held by Public	$ 29,818,945.78
4,231,180.84	Held in Treasury	4,231,180.84
$ 34,050,126.62	Total Capital Stock	$ 34,050,126.62
	LONG TERM DEBT	
$ 48,806,800.00	Long Term Debt Held by the Public and Affiliated Companies	$ 48,624,000.00
.....	Long Term Debt Owned by the Company —Pledged	45,186,000.00
634.09	Scrip Owned by the Company	.....
$ 48,807,434.09	Total Long Term Debt	$ 93,810,000.00
	CURRENT LIABILITIES	
$ 865,278.24	Traffic and Car Service Balances Payable	$ 705,402.44
3,919,404.87	Audited Accounts and Wages Payable	5,648,852.14
135,732.94	Miscellaneous Accounts Payable	1,364,334.59
41,841.00	Interest Matured Unpaid	8,208.50
8,072.50	Dividends Matured Unpaid	8,072.50
457,712.83	Unmatured Interest Accrued	253,782.08
500.00	Funded Debt Matured Unpaid	30,500.00
$ 5,428,542.38	Total Current Liabilities	$ 8,019,152.25
	UNADJUSTED CREDITS	
$ 373,608.67	Tax Liability	$ 331,911.78
28,467.50	Premium on Funded Debt	12,202.28
7,711,168.96	Accrued Depreciation—Equipment	8,066,864.82
544,661.96	Other Unadjusted Credits	471,489.24
$ 8,657,907.09	Total Unadjusted Credits	$ 8,882,468.12
	CORPORATE SURPLUS	
$ 1,194,242.99	Additions to Property Through Surplus	$ 1,205,998.83
4,333,545.19	Profit and Loss	1,597,662.11
$ 5,527,788.18	Total Corporate Surplus	$ 2,803,660.94
$102,471,798.36	Total Liabilities	$147,565,407.93

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